A VALIDATION OF THE CURRICULUM FOR EDUCATING DEFENSE SYSTEMS ANALYSTS AT THE NAVAL POSTGRADUATE SCHOOL

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THESIS

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by

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December 1975

Thesis Advisor: M. G. Sovereign

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)*: A Validation of the Curriculum for Educating Defense Systems Analysts at the Naval Postgraduate School	5. TYPE OF REPORT & PERIOD COVERED: Master's Thesis; December 1975
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): James Vernon Hoekstra	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Naval Postgraduate School, Monterey, California 93940	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: Naval Postgraduate School, Monterey, California 93940	12. REPORT DATE: December 1975
	13. NUMBER OF PAGES: 139
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)*: Naval Postgraduate School, Monterey, California 93940	15. SECURITY CLASS. *(of this report)*: Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

** Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

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S/N 0102-014-6601 |
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SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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A Validation of the Curriculum for Educating Defense Systems Analysts at the Naval Postgraduate School

by

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Submitted in partial fulfillment of the
requirements for a degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1975

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I. INTRODUCTION

The United States Marine Corps has established the need for an officer with specific graduate credentials. This officer is assigned the Military Occupational Specialty (MOS) title of Defense Systems Analyst (DSA). In the MOS numbering system the DSA is assigned the MOS number 9652. In this study Defense Systems Analyst and MOS 9652 will be synonymous. The DSA title is a title unique to the Marine Corps MOS system. The MOS Manual which assigns the DSA title and MOS number also describes the duties and tasks as follows:

> Duties and Tasks Directs, supervises, conducts or participates in studies and analyses of material requirements and force structures, comparisons of weapons systems, and weapon system mixes, uses empirical data, economic theory and mathematical techniques to establish the comparative factors and alternatives available to the decisionmaker, provides technical staff support to associated staff functions to define problems, identify alternatives, and implement cost-effectiveness criteria. Performs technical liaison between agencies engaged in analytical or evaluation studies and monitors the latest developments in the discipline.[1]

This explanation of the "Duties and Tasks" of the DSA is replete with systems analysis terminology which does not convey a clear picture of what the DSA is really supposed to do. A look at how the DSA is trained will shed some light on the question of what the DSA is supposed to be able to do.

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[1]Marine Corps Order P1200.7, 19 Oct. 1972.

A. HISTORY OF THE DSA PROGRAM

In the early 1960's, as systems analysis and program budgeting began to proliferate in the Defense Department, the Assistant Secretary of Defense for Systems Analysis, Professor Alain Enthoven, foresaw the need for DOD officers and civilians to have a thorough knowledge of the methodology and analytical techniques of systems analysis.[2] At his direction a training program was established to provide the training required to develop a cadre of systems analysts in DOD. The first program was a non-degree program which, without the provision for a graduate degree, was unable to attract students. The degree problem was solved by the development of a Masters Degree program in Systems Analysis at the University of Rochester.[3] The program featured a year of graduate courses on the campus of the University of Rochester and three months of "experience" at the Center for Naval Analyses (CNA). CNA is run by the University of Rochester as a civilian analytical organization under contract to the Navy. It supports the Systems Analysis Division (OP-96) of the Office of the Chief of Naval Operations. The Department of the Navy (DON) acted as executive agent for DOD and allocated the annual input quota of 35 among the various agencies of DOD. The Marine Corps was assigned a portion of the Navy quota. This

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[2]Interview with M. J. Bailey, Professor, University of Maryland, 6 November 1975.

[3]Interview with P. Parker, Professor, Naval Postgraduate School, 7 October 1975.

was the Marine Corps' initial training program to develop its own cadre of systems analysts.

The Marine Corps participation in the program extended from 1967 until 1971 when the last student was matriculated at the University of Rochester. During that time various problems beset the program, with respect to the Marine Corps input. The Marine Corps had difficulty in acquiring students for the program. Although the Marine Corps quota was an average of six students per year, the quota was seldom filled.[4] Part of the problem was that Marine officers, in general, did not understand the specific nature of the program. Few officers sought enough details of the program to generate a personal interest. Many of those who did make application for the program failed to matriculate because of the stiff entrance requirements of the Unviersity of Rochester. These difficulties were not unique to the Marine Corps as there was a general lack of interest throughout the services for the University of Rochester Systems Analysis Program.

One area of service dissatisfaction was the high cost. The cost to DOD for the opportunity to input up to 35 students was $350,000 per year. This was the contract cost alone and it did not account for the officers' salaries. As a DOD project, the University of Rochester program survived until 1972, even though diminishing interest by the service components and civilian agencies reduced the student load well below the contract number of 35.

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[4]Memorandum for the Record, John M. Hey, 20 October 1970 [Appendix A-1].

After the last Marine student was matriculated in the Systems Analysis Program at the University of Rochester, two years passed with no Marines being trained for the DSA billets.[5] During that period the sixteen MOS 9652 billets were filled with previously trained DSAs and with officers trained in operations analysis (MOS 9650). Also, during that time, discussion took place in Headquarters Marine Corps (HQMC) about the possibility of training prospective DSAs at the Naval Postgraduate School (NPS). Discussions took place between the Discipline Sponsors' office at HQMC and officials of the NPS to establish a curriculum for the training of DSAs at NPS. The Marine Corps Representative at the NPS, along with several professors of the Operations Research/Administrative Science Department of the NPS, developed a curriculum. (See Appendix B). The curriculum that evolved was an adaptation of an existing management curriculum. In July, 1974 the author arrived as the first Marine input to the tailored Management Curriculum for DSAs.

B. MARINE CORPS SPECIAL EDUCATION

In September 1975, the Marine Corps had 470 billets designated to be filled by officers who had acquired a graduate degree. Of these 470 billets, 16 were designated as MOS 9652. To support the requirement to provide qualified officers to

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[5]Memorandum, DSA Billet Requirements, W. M. Krulak, 2 November 1972 [Appendix A-2].

the 470 billets, the Marine Corps has two educational programs which provide the requisite "special education." The Special Education Program (SEP)[6] and the Advanced Degree Program (ADP)[7] are both administrative processes which provide resources to fulfill "special education" requirements. The Special Education Program allows selected volunteers the option of attending the Naval Postgraduate School (NPS) or one of a specific list of participating civilian colleges or universities. The Marine Corps provides tuition in addition to normal pay and allowances.

The Advanced Degree Program (ADP) augments SEP. It allows the selected, volunteer officer to attend any approved institution of higher learning. The course of instruction proposed by the applicant must be approved by the Marine Corps to assure that it meets the needs of a SEP discipline. The officer is ordered to the area of the school and receives all pay and allowances, but must bear the tuition cost.

Upon successful completion of the graduate education, the officer is assigned a secondary Military Occupational Specialty (MOS) code, signifying qualification in a SEP discipline. Immediate assignment of a graduate to a SEP billet is Marine Corps policy. Only if no billets are available or if the officer is scheduled for an overseas tour is the officer not utilized immediately upon graduation in a SEP billet. Once

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[6]Marine Corps Order 1520.9F of 13 December 1971

[7]Marine Corps Order 1560.19B of February 1973.

utilized in a SEP billet, the officer may be required to serve in a SEP billet on alternating tours.

C. PROBLEM STATEMENT

Because of the newness of the DSA program at the Naval Postgraduate School, the Marine Corps Representative felt that the program should be validated to determine if it meets the needs of the Marine Corps in training DSAs. The author, having completed the major portion of the curriculum in the DSA program, was in an ideal position to conduct the validation study as a thesis project.

At the outset, the author was unsure what role the DSA was supposed to fill. The definition in the MOS Manual was of little help in presenting a clear role definition for the DSA. Role definition for the DSA (MOS 9652) was further frustrated because the definition of the Operations Analyst (MOS 9650) is so comparable. Looking to the incumbents of the MOS 9652 billets brought to light the possible comparability of systems analysis and operations analysis because most of the MOS 9652 billets were filled by officers with MOS 9650 (Operations Analyst). Comparing the education programs of these two SEP disciplines established the fact that the DSA education program is 18 months long while the Operations Analysis education program is 24 months long. Employment of Operations Analysts (OAs) in DSA billets is more expensive than employing DSAs due to this difference in length of education.

Discussions with other students in the DSA program at NPS revealed that none had a clear understanding of the roles and functions of the DSA in the Marine Corps. Further discussion of this situation with several professors revealed that no clear definition of the DSAs roles and functions is available to the individuals who conduct the DSA education program at NPS.

The author has undertaken the problem of validating the curriculum used by the NPS in educating potential DSAs to determine if it meets the needs of the Marine Corps with respect to educating officers to be DSAs. The intermediate objective is to present a description of the roles and functions of the DSA in the Marine Corps. This description of the DSA can provide guidance to the student and to those who see the OA filling DSA billets but are unsure of the difference between them.

D. SCOPE

The problem of validating the NPS curriculum for educating the potential DSA had to be constrained to keep the scope of the problem to manageable proportions. Accordingly, the following assumptions were made:

1. The Naval Postgraduate School (NPS) is the preferred academic institution to train DSAs.
2. A curriculum length of up to 18 months is the preferred curriculum length.

3. The existing requirements for graduation with respect to total credit hours, number of courses, and a Master's thesis are valid requirements.

The first assumption was chosen because it appeared to the author that the NPS has the capability to provide a program responsive to the needs of the Marine Corps, with respect to curriculum and academic environment. The author feels that the Naval orientation of the Marine Corps presents a perfect match with the orientation of a Navy school. The Marine student can benefit from an academic association with Naval officers because the inter-relatedness of the two services makes exposure of the Marine student to Naval issues an important learning process that would not be generally found in a civilian institution.

The second assumption reflects the authors judgement that an academic program longer than 18 months would not be acceptable to the Marine Corps due to the manpower cost. In the authors opinion a program could not be developed for a curriculum of less than 18 months and include a sound systems analysis program, a "fundamentals" program, and a thesis requirement. The "fundamentals" portion of the NPS curricula is an important feature because it allows for relaxing the entrance requirements. The "fundamentals" portion of the NPS curricula allows officers who have been away from the academic environment for extended periods to take undergraduate-level courses prior to undertaking the graduate portion of the curricula. This aspect of the NPS curricula overcomes the problem with stiff entrance

requirements found in the University of Rochester program. With a "fundamentals" program at the beginning of the curriculum and a thesis requirement at the end of the curriculum, a curriculum length less than 18 months would not leave sufficient time for the required graduate-level course work. The curriculum length could, however, be shortened by validating courses in the "fundamentals" program.

The third assumption was made to assure that the program for DSAs was a full graduate program which included all the standards required for a Masters degree from an accredited program. The Masters degree is an important motivator for the individual officer to take the extra effort required to earn a graduate degree. The experience of DOD in trying to establish a viable systems analysis education program appears to confirm the importance of the Masters degree in attracting prospective students.

E. RESEARCH METHODS

Because of the limited information available in published documents concerning the DSA, the author was confined to the use of a limited number of public documents in the form of Marine Corps Publications. It was found that interviews provided a valuable source of information throughout the study. The interviews were conducted with the MOS 9652 billet-holders, the Discipline Sponsor, the SEP Monitor, and the Marine Corps Representative at NPS. Additionally, interviews were conducted with professors at both the Naval Postgraduate School and the University of Rochester.

Part of the research effort involved a one-week long research trip to Headquarters, Marine Corps (HQMC) to conduct interviews with officers holding MOS 9652 billets and to locate documents bearing on the history and intent of the DSA program. The HQMC visit also allowed the author a firsthand view of the DSA functioning in his day-to-day activities.

F. ORGANIZATION

This thesis examines the validity of the current Naval Postgraduate School curriculum for training DSAs and presents a profile of the DSA. The study was organized as follows:

1. Establishing the nature of the systems analysis discipline.
2. Describing the administrative procedure by which DSA billets are identified and authorized.
3. Illustrating where in HQMC and DOD organizations the DSA billets are located and what functions are accomplished in each organization.
4. Describing the relationship of DSA functions to the PPBS and then illustrating the processes accomplished in DOD PPBS, DON PPS, and Marine Corps PPBS.
5. Generating a descriptive profile of the DSA.
6. Comparing the University of Rochester Systems Analysis Curriculum as a model to the Naval Postgraduate School curriculum for training DSAs.
7. Recommending changes to the Naval Postgraduate School curriculum to rectify shortcomings brought to light in the comparison.

8. Recommending the development of courses which are needed by the DSA and not currently available at the Naval Postgraduate School.

The MOS 965 billet title of Operations Analyst is not to be confused with the identification of operations analysis as a general field of knowledge on page 24. The curriculum in Operations Research/Systems Analysis at NPS which leads to MOS 9652 covers both operations analysis and systems analysis as defined in the next chapter, as will be explained.

II. SYSTEMS ANALYSIS

In order to understand the role of the Defense Systems Analyst in the Marine Corps, one must understand some things about systems analysis on which the functions of the DSA are based. This chapter is designed to establish a general definition of systems analysis and to identify the segment of systems analysis into which military systems analysis fits.

A. DEFINITION OF SYSTEMS ANALYSIS

Systems analysis is difficult to define clearly and explicitly. Experts on systems analysis have been unable to provide a definition which is acceptable to everyone. As Mr. Alain Enthoven has said: "What is systems analysis? I have been unable to produce a good brief definition."[8]

Mr. E. S. Quade states the same thing as he attempts to arrive at a definition.

> We would suggest that, properly speaking, it is a research strategy, a perspective on the proper use of the available tools, a practical philosophy of how best to aid the decisionmaker with complex problems of choice under uncertainty. In the absence of a good brief definition, systems analysis, as the term is intended to be understood in this book, can be characterized as a systematic approach to helping a decision maker choose a course of action by investigating his full problem, searching out objectives and alternatives, and comparing them in the light of their consequences, using an appropriate framework- in so far as possible analytic- to bring expert judgement to bear on the problem.[9]

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[8]Tucker, S.A., A Modern Design for Defense Decision ICAF, 1966.

[9]Quade, E. S., and Boucher, W. I., Systems Analysis and Policy Planning, p. 2.

Although Quade's definition is very general, it is as specific a definition as could be found. The definition raises more questions than it answers. For instance such terms: "Complex problems," "tools," and an "appropriate framework," are not specific enough to be definitive. The reader must know more if he is to put systems analysis in perspective. Additionally, the generality of Quade's definition leads one to believe that there is universal applicability of systems analysis to any type of problem facing any possible decisionmaker. Mrs. I. Hoos, a critic of systems analysis, refers to this universal applicability as "Broad inclusiveness."[10] She further states:

> The notion of 'system capability' originated perhaps through lexicographical laziness, has been strengthened by a number of factors and accidents of history, economics, and politics, to be discussed later. The outcome has been calculated avoidance of specificity, with easy slipover from one area to another accomplished largely by manipulation of the superficial platitudes common to all and a studied neglect of the particulars that often comprise the essential nature of each. Current usage suggests that he who has 'systems capability' can analyze, engineer, and manage any system.[11]

Perhaps the problem with "essential nature" can be resolved to some degree by considering the origin and history of systems analysis and identifying classes of problems to which systems analysis is applied in some form.

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[10]Hoos, I. R., Systems Analysis in Public Policy, University of California, 1972, p. 17.

[11]Ibid., p. 18.

B. ORIGIN OF SYSTEMS ANALYSIS

Systems analysis was an outgrowth of the success of operations research to the tactical operations of World War II. The demand for more technical expertise in the employment of new weapon systems of World War II called for the application of scientific analysis which created a body of knowledge known as operations analysis. The demand was to solve problems of a tactical, operational nature such as, determination of the most effective bombing patterns, determination of the most effective antisubmarine search procedures, and determination of the deployment of destroyers to best protect a ship convoy.[12]

Operations analysis solved problems which were characterized as being of a tactical operational nature; having specific objectives, often of a quantitative nature; having specific inputs and having limited areas of uncertainty. Operations analysis developed into an applied science and extensions called "operations research," "management science," "cost-effectiveness analysis" and finally "systems analysis" evolved. These are the examples of "lexicographic laziness" to which I. Hoos referred.

The success of operations research in solving tactical operational problems suggested the possibility that a similar approach might prove successful in dealing with national security policy and strategy. Some of the first efforts with this new class of problem met with criticism from military

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[12]Quade, E. S. and Boucher, W. I., op. cit.

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[12]Quade, E. S. and Boucher, W. I., op. cit.

analysts who could see no comparison between the specifically defined tactical problems which had specific and reliable inputs to the loose, vaguely defined problems of national security policy, which had imprecise inputs fraught with uncertainty. With its reliance on clear, quantifiable objectives, known inputs, and limited uncertainty, operations research didn't have the tools required to deal with this larger, less clearly defined type of problem. Systems analysis evolved to handle this new dimension in defense planning.

Systems analysis evolved as an application of the scientific method to problems of economic choice.[13] As an applied science, its objective was not to predict, but to recommend or to present acceptable courses of action. As a result, it falls into the scientific continuum nearer to engineering than to a pure science; nearer to medicine than biology; nearer to civil engineering than to nuclear physics. Comparable, is the view that systems analysis is to operations analysis as strategy is to tactics.[14]

C. PERSPECTIVE RELATIVE TO OTHER ANALYSES

As previously mentioned, a continuum can be drawn between operations research and systems analysis. Because of this continuum, no clear line of demarcation between operations

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[13] Ibid.

[14] Tucker, S. A., op. cit., p. 170.

analysis and systems analysis can exist. The principles utilized by each are the same. Because neither occupies a specific point on the continuum, a subject for operations analysis may be very close to a topic for systems analysis with no clear-cut criterion for identifying to which the subject properly belongs. Operations analysis addressed the clearly defined, tactical-type problems, but another type of analysis was required to address the loosely defined, strategic-type problems. The new form of analysis, which evolved, identified alternative solutions to the problem, computed the cost of each alternative, measured the effectiveness of each alternative in solving the problem, and compared the alternatives in terms of both cost and effectiveness. This analysis, termed cost-effectiveness analysis, is a technique used in systems analysis and is not a competing form of analysis. This area of confusion frustrates a clear understanding, and an explicit definition of systems analysis.

In 1961 President Kennedy, with a mandate from Congress to improve management in the Department of Defense (DOD), appointed Robert S. McNamara to the position of Secretary of Defense (SecDef). McNamara, former president of Ford Motor Company and management expert in his own right, placed in key DOD positions former RAND Corporation economists.[15] Through the efforts of these men, program budgeting was brought to DOD. From this activity evolved the DOD Planning,

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[15]Hoos, I. R., op. cit., p. 45-47.

Programming and Budgeting System (PPBS). The DOD PPBS generated the requirement for systems analyses to be accomplished at the headquarters level of all the services and in DOD. As this effort progressed, there became an Assistant Secretary of Defense for Systems Analysis. The net result of the introduction of PPBS into DOD and the services was to generate the requirement for many individuals knowledgeable in the methodology of systems analysis.

The DOD PPBS has three categories of distinguishing characteristics: a framework of national security type objectives established within a budget format, a management information system which contains information on the progress of programs and provides data for analysis, an application of systems analysis at higher service echelons to identify and evaluate courses of action.

The DOD PPBS was touted as a success throughout the government, and the Congress was generally convinced of its value. By 1965, President Johnson had become such a proponent of systems analysis that he prescribed the PPBS for use in all federal agencies. From the federal level PPBS pervaded all levels of the public sector although it was not always a success.

D. METHODOLOGY OF SYSTEMS ANALYSIS

At this point, the orientation of systems analysis is established relative to the type of problem it addresses. The viewpoint of systems analysis has been described as "Macro" in character. In systems analysis, the analysis focuses on

the whole system rather than components of the system under analysis. The orientation of systems analysis across business and government lines has been discussed. But, still, there is no clear image of systems analysis to grasp and examine. The analytical concept is yet to be established. This section describes the steps utilized by systems analysis experts to conduct analyses.

E. S. Quade conceptualizes the methodology of systems analysis as being iterative in nature and of proceeding through the following phases:[16]

1.	Formulation (Conceptual phase)	Clarifies objectives of the system, defines issues of concern, and limits the problem.
2.	Search (Research phase)	Look for data and relationships, as well as alternative programs of action which can be used to solve the problem or achieve the objectives.
3.	Evaluation (Analytic phase)	Build various models to predict consequences which are likely to follow from each choice of alternative. Then compare the alternatives in terms of the predicted consequences.
4.	Interpretation (Judgemental phase)	Using predictions derived from the models along with other information which is relevent to further compare the alternatives. From the comparison derive conclusions and indicate a course of action.
5.	Verification (Scientific phase)	Test the conclusions by experiment.

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[16]Quade, E. S. and Boucher, W. I., op. cit., p. 33.

British Systems Analysts, J. E. Bingham and G. W. P. Davies,[17] see six main steps to systems analysis. They claim that a novice systems analyst could be sure of doing a thorough job of systems analysis if he were to follow the six steps outlined below:

1. System Project Selection- Every systems project must be the object of a selection process. A Systems Analyst often does not participate in this process but must confirm the judgement of selection.

2. Feasibility Study- Object is to list possible ways of accomplishing the system project objectives. List includes comparison of costs and best course is indicated.

3. Definition Phase- Object is a system definition of the current system. Analysis of current systems performance in meeting system objectives. Identify constraints in the system. Prepare design specifications.

4. Design Phase- Object is to prepare a complete systems design for implementation. Every aspect of the whole system must be designed. Revised operation cost is completed and an implementation plan produced.

5. Implementation Phase- Object is to achieve an operational system with full documentation. System parts are phased in and tested.

6. Evaluation Phase- A reiterative step which assures that the system operates and is error free. Achievement of systems objective is tested.

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[17] Bingham, J. E. and Davies, G. W. P., A Handbook of Systems Analysis.

The two methodologies are basically the same overall, but the steps aren't exactly comparable because of the different environments in which each is used. The environment of the Quade formulation is the public sector, while the environment of the Bingham/Davies formulation is the private business sector. The Quade formulation is general enough to be utilized on the broader, less well defined problems of National Security while the Bingham/Davies formulation is specific enough to be utilized to address the narrower, more well-defined problems of business.

E. APPLICATIONS

In the military arena, systems analysis provides the decisionmaker with analytical insight into three different areas: choice of tactical alternatives, design and development of weapons systems, and determination of major policy alternatives. Systems analysis conducted at various levels of the PPBS encompass these three areas of military systems analysis. But, in addition, systems analysis is conducted in the military under these three areas outside of the PPBS. An illustration of these three military areas is shown in Figure 1.[18]

These problems addressed by systems analysis show a range of specificity. Problems such as determining the best armament for an interdiction mission, are more specific than those such

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[18]Quade, E. S. and Boucher, W. I., op. cit.

Figure 1

SYSTEMS ANALYSIS PROBLEM TYPES

Problem Area	Examples
CHOICE OF TACTICAL ALTERNATIVES	Determining the armament for an interdiction mission.
	Selecting a fire control system for a new fighter.
DESIGN AND DEVELOPMENT OF WEAPON SYSTEMS	Selecting a preferred set of space boosters.
	Determining the need for Army airlift.
DETERMINATION OF MAJOR POLICY ALTERNATIVES	Determining the role of space systems in national defense.
	Deciding between a policy of military superiority and one of parity with the Soviet Union.
	Determining if forces based in the United States, backed by airlift can replace forces based overseas without weakening our prestige or military capability.

as determining the role of space systems in national defense. The first type of problem is more specific than the second, and it lies in the area of systems analysis which is closer to operations analysis. Again, this shows that systems analysis and operations analysis has no clear line of demarcation so that some problems in the province of systems analysis are similar to those in the province of operations analysis.

F. TOOLS OF SYSTEMS ANALYSIS

Within the analytical methodology previously mentioned is the use of models as predictive devices to establish the results of proposed courses of action. The term "model" is used to mean a simplified representation of reality. Many people think of a model as either a mathematical model or a computer program model. These models can be used in systems analyses, but other models are used as well. Many models are not explicitly mathematical, nor do they have any relation to computer operations. A model attempts to contain those factors that are most relevant out of all possible factors that could be relevant to the problem. The model also attempts to describe the primary relationships between the factors pertinent to the output of the system under analysis. Again, one might consider models as being in a continuum with mathematical models on one hand and non-mathematical models on the other.

Queueing theory is an example of the first kind of model while the Rational Analytic Model[19] is an example of the

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[19]McNallen, J. B., etal,"The Use of Models for Analyzing the Budget Decision Process."

second. The Rational Analytic Model states that an organization's activities, behavior, and decisions can best be understood by assuming that the organization is directed by a single, purposeful, rational individual who optimizes his objectives. The first model might be used in a systems analysis dealing with the induction of aircraft into an overhaul activity while the second model is one which is used in the systems analysis effort conducted in the PPBS.

Other examples could be given of both types of models. It is important to note, that the name of the model is often associated with the word "analysis" and the resulting name clouds the fact that the analysis is, in reality, a "systems analysis." Cost-effectiveness is an example. One might perceive cost-effectiveness analysis to be something distinct from systems analysis when, in reality, cost-effectiveness analysis is a technique used in systems analysis. This situation frustrates the effort for simplicity and clarity in defining systems analysis.[20]

Tools of systems analysis have economic origins. The merging of operations analysis methodology with economic and business management techniques has established the analytical nature of systems analysis which helps distinguish it from operations analysis. Such business management techniques as budgeting, cost accounting, and capital investment criteria are utilized in systems analysis. The theories of public goods,

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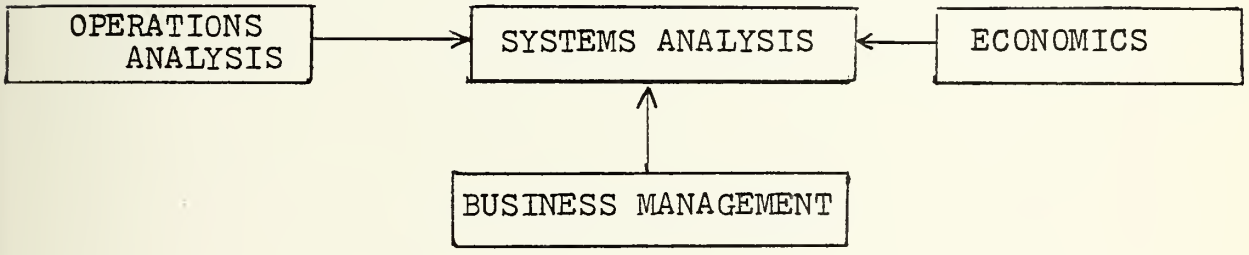
[20]Hoos, I. R., op. cit., p. 42-44.

welfare economics, and cost-benefit analysis are among the elements of economic theory used in systems analysis. The concept of operations analysis has already been mentioned as having influenced the development of systems analysis. Figure 2 illustrates what separate major disciplines are utilized in the wide range of systems analyses.

Figure 2

DISCIPLINES IMPACTING ON SYSTEMS ANALYSIS



G. SUMMARY

This chapter has provided an overview of the academic discipline in which the Defense Systems Analyst (DSA) is trained. The overview is provided to the reader as background information to illustrate the environment of the systems analysis discipline. The systems analysis discipline was discussed by describing the following:

1. Problems with defining systems analysis,
2. Origins of systems analysis,
3. Relationship of systems analysis to other analyses,
4. Methodology of systems analysis,

5. Application of systems analysis,

6. Tools of systems analysis.

With a picture of the DSAs academic discipline established as background information, the focus of the study shifts to locating and studying the billets to which a DSA can be assigned.

III. DEFENSE SYSTEMS ANALYSIS (DSA) BILLETS

At the present time, most of the authorized Defense Systems Analyst (MOS 9652) billets are at Headquarters Marine Corps (HQMC). Of the sixteen authorized billets, twelve are at HQMC. The remaining four billets are located as follows: one billet is located in the Marine Corps Development Center, two are located in the Defense Communications Agency (DCA), and one is located in the Office of the Secretary of Defense.[21]

The twelve DSA billets located at HQMC are not pooled at any one location. They are spread throughout the staff structure. Figure 3 shows how HQMC is organized into staff sections. The numbers in the figure indicate the numbers of MOS 9652 billets in each specific staff section. This organization reflects the philosophy that the DSA should not be involved extensively in conducting systems analyses, but should validate those analyses, produced by others. Additionally, the organization reflects the idea that the systems analysts should be spread throughout the staff structure to provide analytical consultation for the branch each is assigned. The five DSAs assigned to Requirements and Programs Division reflects a major requirement for systems analysts rather than a pooling. The number of MOS 9652 billets authorized at any one time is the result of a justification process. Although the process

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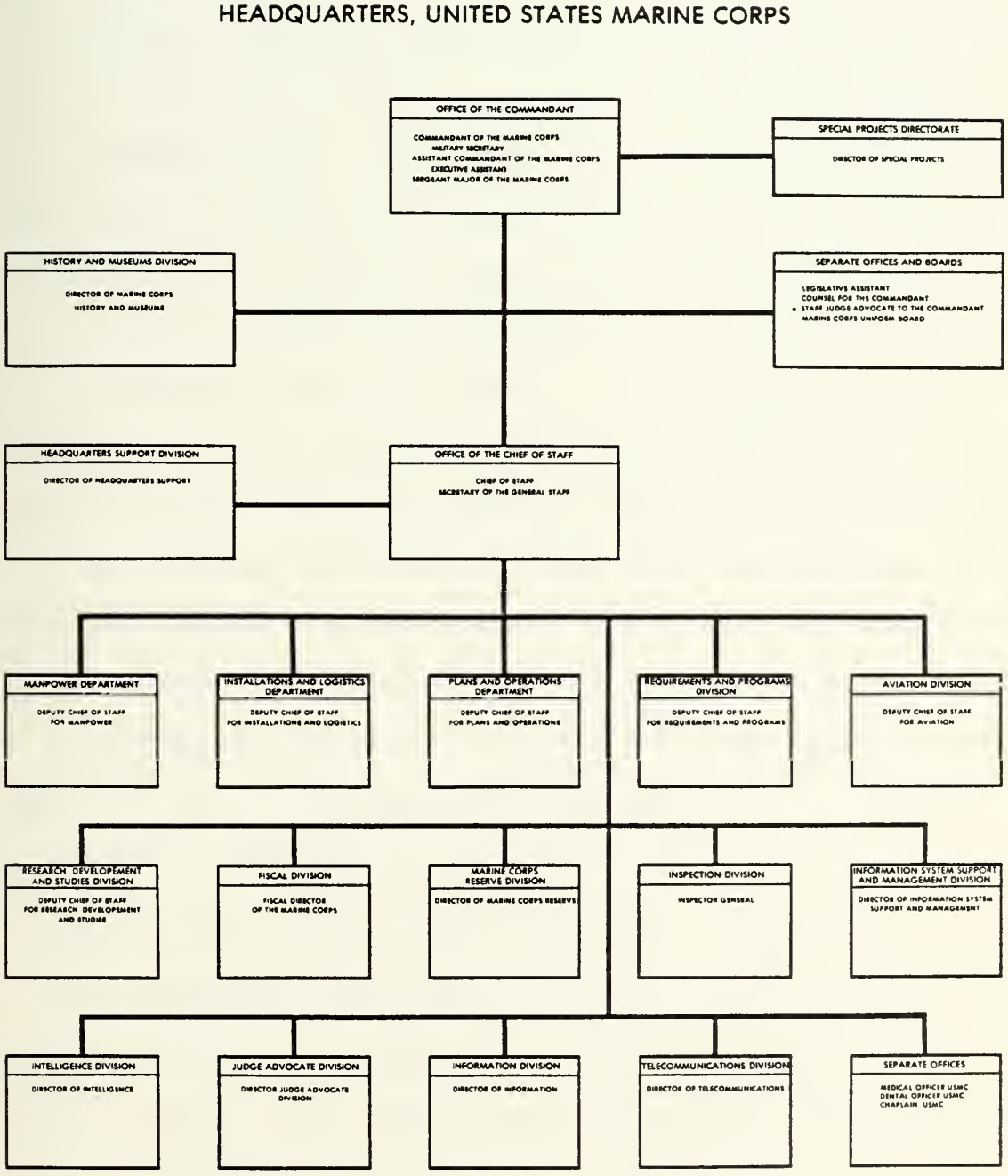
[21]Table of Manpower Requirements, MOS 9652 Billets [Appendix C].

FIGURE 3

HQMC STAFF ORGANIZATION



will be covered in detail in the next section, it is mentioned here to establish the fact that there does exist a process whereby the number of DSA billets can change.

The fact that these billets must be filled on a continuing basis requires that for each billet there must be more than one man trained. Bearing on the number that must be trained, is that fact that the officer who holds the 9652 MOS holds it on a secondary basis. That means that he has a primary specialty which dictates his career pattern. The various requirements of a career pattern do not allow the officer who has been trained as a DSA to be available to hold a MOS 9652 billet on a continuous basis. Requirements for military schools training, overseas deployments, aviation requirements are to name just a few. The net result is that the Marine Corps has the goal to have 2.4 officers trained for each billet. Presumably, this allows the individual to meet the other requirements of his career. The objective of the education effort, then, is to attract and train 2.4 officers for each of the billets authorized. In this case, with sixteen billets, the objective is to have 38 officers educated as DSAs.[22]

A. ESTABLISHING SPECIAL EDUCATION (SEP) BILLETS

The administrative process by which billets are identified as requiring graduate education (special education) is a dynamic process. The administrative process[23] provides that

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[22]Memorandum, DSA Billet Requirements, W. M. Krulak, 2 November 1972 [Appendix A-2].

[23]Headquarters Order 1500.5F, 1971.

certain parties can initiate action to have a billet identified as requiring the incumbent to have specific graduate education. Additionally, a review process requires that each billet designated as requiring graduate education be rejustified each year. Considering these aspects of the administration process, it is obvious that the number of billets requiring graduate education can change each year. The following paragraphs illustrate how different parties interact in the process to have a billet designated as requiring graduate education.

The most important party involved in the process is the discipline sponsor. The discipline sponsor is the HQMC staff section designated officially as the HQMC expert on the subject discipline. As the Marine Corps expert on the subject discipline, the section so designated has major responsibilities in determining if billets nominated actually require graduate education. Additionally, the discipline sponsor is responsible to determine what school and what curriculum should be used to educate officers in the subject discipline. The discipline sponsor is involved as a primary actor in the justification process by which graduate education is justified for a specific billet. Discipline sponsor is responsible to conduct a rejustification process for each billet each year.

The process of having graduate education authorized for a specific billet may be initiated by any one of the following four agencies or parties:[24]

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[24] Ibid.

1. Regular commands (Divisions, Wings, etc.)
2. Discipline sponsor having cognizance over the discipline involved.
3. HQMC staff agency for billets within their purview.
4. Table of Organization (T/O) Sponsor.

The T/O sponsor is the HQMC staff agency with administrative control of the table of organization into which the subject billet resides. The regular command is the structural command into which the billet resides. The HQMC Staff Agency is any major staff division. [See Figure 3]

Any of the four can initiate action by listing specific requirements and justification and forwarding the list to the cognizant discipline sponsor. The requirements and justification elements are forwarded in the form of a Billet Education Evaluation Certificate (BEEC). A representative BEEC for a DSA billet is shown in Figure 4. (See Appendix D) The BEEC is signed by the discipline sponsor to show his concurrence with elements of the discipline training. The BEEC is also signed by the T/O sponsor to show his concurrence with having the billet classified as requiring graduate education. The BEEC is then forwarded to the DC/S Manpower for a decision. He can approve or disapprove. If approved, the BEEC is filed as the justification document authorizing the graduate training for the billet.

Billets with graduate education prerequisites are grouped into two categories; those in which graduate education is "Necessary;" those in which graduate education is "Desirable."

Figure 4

BEEC

BILLET EDUCATION EVALUATION CERTIFICATE (1500) *Ref: HQO 1500.5__* **REPORT SYMBOL HQ-1500-10**

NAVMC HQ 643 (REV. 1-72) (2-70 EDITION IS OBSOLETE AND WILL NOT BE USED)

Complete a separate Certificate for EACH billet

T/O NUMBER	T/O LINE NUMBER	BILLET TITLE/ORGANIZATION TITLE/ORGANIZATION LOCATION
5104	41	Structure Requirements Officer, Requirements Branch, DC/S for R&P

GRADE	MOS	REQUIRED BY F/Y	OSO/JCS POSITION DESCRIPTION NO.	WOMAN MARINE QUALIFIED
Major	98 52 __	197__		☐ YES ☒ NO

CURRICULUM SHOULD INCLUDE (List comprehensive area and/or courses required for this billet)*

(1) National Security Objectives
(2) Defense Department Management
(3) Systems Analysis/Operations Analysis
(4) Computer & Numerical Analysis
(5) Criteria for Public Expenditures
(6) Probability & Statistics
(7) Theory of Decision Making
(8) Economics
(9) Econometrics

JUSTIFICATION (Simple, brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)*

The billet incumbent needs a specialized education in disciplines which will allow him to work with manual and computer based analysis techniques to determine Marine Corps FMF structure requirements and evaluate the impact of changes in weapons systems, manpower levels and fiscal constraints on current and projected FMF structure. Additionally, the assigned officer must be able to examine other types of problems that consider both cost and quantifiable effectiveness and be able to produce alternative means of resolution which remains within alloted/projected Marine Corps resources, mission and capabilities. Finally this officer's education background should be such that it will allow him to provide analytic support to the DC/S for R&P in the continuous appraisal of Marine Corps programs under R&P sponsorship as well as maintain meaningful liaison with analysts and programmers in other staff agencies of HQMC.

SPECIAL EDUCATION DISCIPLINE (Select the course of instruction and alternate to be attended which best fits the exact requirements of the billet. MCO 1520.3___)	RECOMMENDED LENGTH (Years)
Defense Systems Analysis Curriculum	1 1/4

RECOMMENDED INSTITUTION AND LOCATION (Select school and location best suited for the exact educational requirements of this billet. List alternate institution, if applicable.)	EDUCATIONAL PREREQUISITE (MCO 1500.3___)
U. S. Naval Postgraduate School, Monterey, Calif.	☒ NECESSARY ☐ DESIRABLE

SIGNATURE OF ORIGINATOR/CODE/DATE	SIGNATURE OF APPROVER/CODE/DATE
T. OWENS, DC/S for R&P, 13Feb74	T. OWENS, DC/S for R&P, 13Feb74

DEPUTY CHIEF OF STAFF (MANPOWER) DECISION

APPROVED:	DISAPPROVED:	DATE
S. JASKILKA 3/27/75		

FOOTNOTE: (For [illegible] use only)
Replaces BEEC approved by C/S on 10 Jan 68 (T/O 5103, Line 32).

Under the classification of "Necessary" are those which meet one of the following:[25]

1. Billets required by law or DOD policy to be filled by individuals possessing graduate education.
2. Billets in which the primary duties cannot be satisfactorily performed except by an individual with qualifications attained only through graduate education.
3. Billets filled by individuals who must exert supervision over individuals in billets for which graduate education prerequisites exist.
4. Billets filled by individuals who are required to possess knowledge of a specific field of study to permit effective staff planning, coordination, and command functioning.

Under the "Desirable" classification are all other billets which do not meet any of the criteria listed above, but which can be most effectively filled by individuals with specialized training. The difference in the approval process between the two categories is that the "Desirable" BEECs are approved/disapproved one step lower in the HQMC organization by the Assistant Chief of Staff, G-1. Additionally, the Chief of Staff, G-1 annually convenes a review board, to review in detail the requirements of each billet for which graduate education is required.

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[25] Ibid.

Prior to the annual Special Education Review Board meeting, the discipline sponsor accomplishes extensive review work of each billet for which he is the discipline sponsor. He justifies new requirements for graduate education. He reviews courses of instruction utilized in graduate education programs for each billet. He recommends, in conjunction with recommendations for curricula, appropriate schools for each course. He indicates the appropriate grade for each billet.

The discipline sponsor is the discipline expert. Therefore, he plays a key role in the whole process by which billets are identified as requiring graduate education and by which personnel are educated in specific programs at specific schools. On his shoulders rests the bulk of the staff work required to make the system operate. Clearly, the continuity, timeliness, and positive functioning of the program depends heavily on the discipline sponsor. The discipline sponsor for Defense Systems Analysis is DC/S Requirements and Programs Division. [See Figure 3]

B. MANAGEMENT OF SEP ASSETS

Management responsibility for SEP assets rests with DC/S Manpower. DC/S Manpower accomplishes the management of SEP assets through the activities of the SEP Monitor. The SEP Monitor functions primarily to assign officers with SEP education to SEP MOS billets. The manner in which the SEP monitor operates and the problems he encounters are further explained later in this section.

The SEP Monitor is guided by policy which states:

> Upon completion of Special Education Program (SEP) training officers will serve one tour in an approved SEP billet as soon as practicable. Thereafter, officers may, depending on Marine Corps requirements, be required to serve one or more additional SEP utilization tours on an alternating basis with non-SEP tours. Adequate opportunity will be afforded for broad career development and professional education.[26]

Because MOSs requiring graduate education are assigned as "secondary MOSs," there exists the career pattern of the "primary" MOS to satisfy. Therein lies the importance of the term "broad career development and professional education." The demands of career development, as well as the demands of professional education, compete with the full availability of the SEP graduate to fill SEP billets. The requirement for regular overseas rotations further strains the graduate-educated officer's availability for SEP billets.

As was mentioned earlier, the periods of non-availability of the graduate-educated officer to fill SEP billets requires that a pool of qualified officers be trained for each specific MOS. This pool of trained officers provides the resources to fill the MOS billets with officers having the proper rank and qualifications. It is the responsibility of the Deputy Director of Personnel to maintain this inventory.

In the case of the 16 MOS 9652 billets, there should be 38 officers trained (on the basis of 2.4 per billet) in the pool. Presumably, this figure should include only those

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[26]Marine Corps Order 1520.9C, 13 December 1971.

officers who have been qualified and can now, or at some time in the future, be assigned to MOS 9652 billets. Clearly, it should not include officers who for some reason can never, either because of rank or policy, be utilized to fill MOS 9652 billets.

Although the pool of MOS 9652 officers should have 38 officers for the 16 billets, there has never been that many trained. The reason is because of the lack of success with the University of Rochester program. The current status of the MOS 9652 pool is shown in Figure 5. [See Appendix E]

Figure 5

POOL OF MOS 9652 OFFICERS

RANK	NUMBER	EDUCATION PROGRAM
trained		
Colonel	4	University of Rochester
Lieutenant Colonel	7	University of Rochester
Major	3	University of Rochester
under training		
Major	5	Naval Postgraduate School
Captain	3	Naval Postgraduate School

The four colonels carried in the pool are not available for assignments to MOS 9652 billets. There are effectively only 10 officers trained and available in the MOS 9652 pool. The author found, in discussion with incumbents of the 16 MOS 9652 billets, that only three of the officers trained as DSAs were

holding MOS 9652 billets. The remaining 13 billets were filled by officers having graduate degrees in some other discipline. Eight of these officers were Operations Analysts (MOS 9650). The low number of DSAs holding MOS 9652 billets reflects the fact that the other 11 (including Colonels) trained DSAs are involved in alternate tours in a primary MOS, professional education, or some other aspect of "broad career development."

The individual who is most directly involved with using the pool is the SEP Monitor. He fulfills DC/S Manpower responsibility for maintaining the pool listing of officers trained in each SEP MOS. He is further responsible for staffing each SEP billet with an officer with the proper SEP MOS and rank. In accomplishing this staffing, he coordinates with the primary MOS monitors and the discipline sponsors. When no officers are available from the appropriate SEP discipline pool, the SEP Monitor must assign an officer from a SEP MOS which is comparable.

When the SEP Monitor must assign an officer to a SEP billet which is different from the SEP MOS held by the officer, the situation is not always rectified when an officer with the appropriate MOS becomes available. For example, even though only three DSAs are assigned to DSA billets, the author may not be assigned to a DSA billet unless some officer is normally rotated from a DSA billet. An MOS 9650 (Operations Analysis) officer holding a DSA billet would not be rotated, as a matter of course, to place the author (MOS 9652) in a MOS 9652

billet.[27] This situation results from the desire by all concerned to avoid personnel turbulence, particularly when an officer holding a billet outside his MOS is performing creditably. The author points up this situation as one which serves to reduce the availability of a SEP trained officer to function in the SEP MOS for which he was trained. The importance of this problem becomes obvious when one realizes that an officer is available only a limited amount of time due to the other demands previously mentioned. The inflexibility generated once an assignment is made highlights the importance of having an adequate pool of trained officers for each SEP MOS to assure that an officer can be correctly assigned from the outset.

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[27]Interview with Major T. L. Miner, U.S.M.C., SEP Monitor, 8 September 1975.

IV. LOCATION AND FUNCTIONING OF THE DSA

The foregoing background information showed the location of each of the MOS 9652 billets in HQMC. This chapter will locate each of the 16 MOS 9652 billets and outline the functions accomplished in the staff organizations to which each is assigned. This is an attempt to establish the nature of the actions which the DSA may be required to accomplish. The author believes that defining how the DSA is expected to function will shed light on fruitful areas of study for the prospective DSA. Figure 6 depicts the location and number of MOS 9652 billets in the Marine Corps. Twelve of the billets are in HQMC staff sections. Two billets are located in the Defense Communications Agency. One billet is located in the Office of Assistant Secretary of Defense (OASD). One billet is located at the Marine Corps Development Center. [See Appendix C]

Figure 6

LOCATION OF DSA BILLETS

Location	# of Billets
HQMC	
Requirements and Programs	5
Manpower Department	2
Fiscal Division	2
Plans and Operations	1
Aviation Division	1
Information Systems Support and Management Division	1
Development Center, Marine Corps Dev. Ed. Cmd.	1
OASD(Program Analysis and Evaluation)	1
Defense Communication Agency	2
Total number of MOS 9652 billets	16

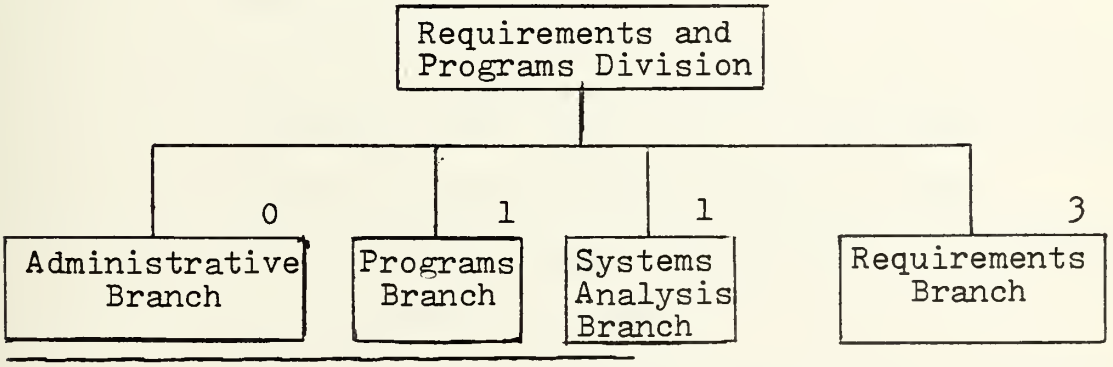
The author utilized the Marine Corps Organization Manual[28] to outline the functioning of the HQMC staff sections which have MOS 9652 billets. He utilized interviews with the incumbents of the MOS 9652 billets to develop information concerning the functioning in those DSA billets outside HQMC.

A. REQUIREMENTS AND PROGRAMS DIVISION

Requirements and Programs Division has a major role in the Marine Corps Planning, Programming and Budgeting System (PPBS). Deputy Chief of Staff, Requirements and Programs (DC/S R&P) and Deputy Chief of Staff, Plans and Operations (DC/S P&D) assist the Chief of Staff in directing the staff in all phases of planning and programming. Requirements and Programs Division is organized as shown in Figure 7 to accomplish its mission of assisting in the administration of the PPBS in the Marine Corps.[29]

Figure 7

REQUIREMENTS AND PROGRAMS DIVISION



[28]Headquarters Order p5400.18, 25 April 1974.

[29]Number of MOS 9652 billets is shown by each Branch.

1. Programs Branch

The Programs Branch has the mission of supporting DC/S R&P by administering the programming activity and fiscal matters associated therewith. The Branch also assists in the development and coordination of administrative procedure which provides optimum means of achieving Marine Corps program objectives and assurance that approved programs are executed in a timely manner. There is one MOS 9652 billet assigned to this branch to perform the following functions:

1. Translate unit and force requirements into specific structure, manpower and equipment/ weapon system programs.
2. Analyze current and proposed Navy/Marine Corps Programs.
   Coordinate the development of Marine Corps Programs beyond the budget year.
3. Submit approved program data for inclusion into the Department of the Navy, Program Objectives Memoranda (POM).
4. Maintain detailed distribution record of the personnel plan reflected in Department of Defense (DOD) Five Year Defense Program (FYDP).
5. Monitor achievement of the Marine Corps Program contained in the FYDP.
6. Monitor other service programs and programming systems for impact on the Marine Corps.

7. Supervise the preparation, updating, and publication of the Marine Corps Manual For Planning and Programming.

The extensive list shown above highlights the areas in which the Defense Systems Analyst assigned to the Branch is expected to function. In addition to having extensive opportunity to employ systems analytical tools, the Defense Systems Analyst coordinates with counterparts in the Army, Navy, Air Force and industry. Thus, his knowledge of terminology, conceptual approach, and subject matter of military systems analysis is utilized in communication and interaction with other experts involved in planning and programming actions which are of importance to the Marine Corps.

2. Systems Analysis Branch

The Systems Analysis Branch reviews the execution of the Marine Corps Program and assesses the attainment of the program objectives as reflected in the POM and the FYDP. It further performs inter-program review, analysis and evaluation of the existing program and new initiatives proposed by appropriation and systems sponsors with the goal of refining the Marine Corps Program reflected in the FYDP.

The only MOS 9652 billet in the Systems Analysis Branch is that of the Branch Head who is responsible to accomplish the following functions:

1. Review and evaluate achievement of previously approved Marine Corps approved objectives.

2. Conduct independent reviews for DC/S R&P of proposed systems acquisition during the requirements approval process as directed.
3. Develops and publishes the Marine Corps Initial Program Guidance (MCIPG) on an annual basis.
4. Coordinate the development of Marine Corps staff initiatives related to POM development and assists in the evaluation of initiatives to establish priorities.
5. Support the development of the Commandants Program Fiscal Guidance (CPFG).
6. Review coordinated inputs to the Joint Forces Memorandum (JFM) and POM.
7. Perform analysis of the implications in major issue papers, reclamas related to Program Decision Memorandums (PDM) and programming actions initiated by other services or Defense Agencies, which could effect the Marine Corps.

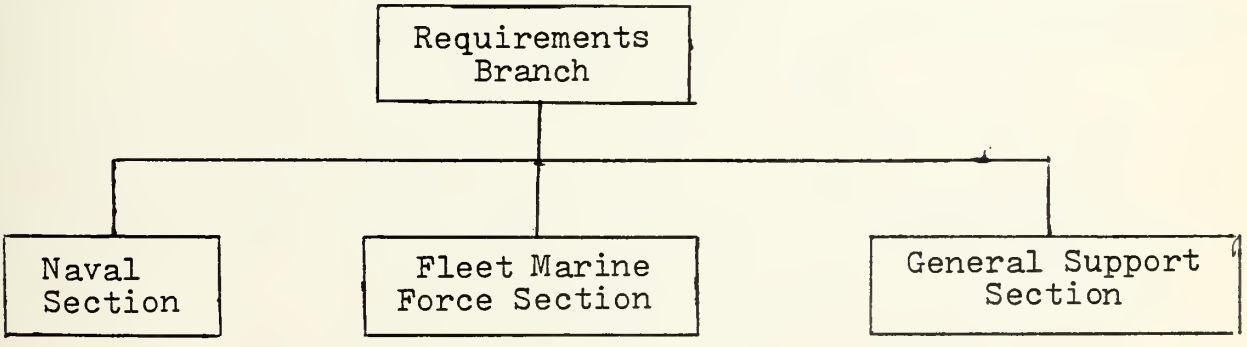
It appears that both the Programs Branch and the Systems Analysis Branch accomplish some of the same functions with respect to the Marine Corps PPBS and DOD PPBS. This is true with respect to monitoring the progress of accomplishment of the Current Marine Corps Program and with respect to monitoring other service inputs to the DOD PPBS which might affect the Marine Corps Program.

3. Requirements Branch

The largest single branch with respect to MOS 9652 billets is the Requirements Branch which has three Defense Systems Analysis billets. The Requirements Branch assists DC/S R&P to exercise primary staff cognizance over: validation of all requirements for capabilities to meet Marine Corps objectives; development of required force structure to support Marine Corps objectives in near, mid and long term periods; evaluate program attainment to initiate inputs into DON, POM, and serves as focal point for R&P - related actions with the Chief of Naval Operations (CNO) staff on Navy/Marine Corp matters (less air). With such wide ranging interests into functional areas, Requirements Branch is subdivided along the functional lines shown in Figure 8.

Figure 8

REQUIREMENTS BRANCH



a. Naval Section

The functions assigned to the Naval section are:

(1) Monitor and coordinate the review of Navy programs (less air) which potentially impact on the joint Navy/Marine Corps amphibious mission.

(2) Act as focal point for PPBS related matters between HQMC and OPNAV staff on Navy Support requirements/programs (less air) associated with the joint amphibious mission to include the following:

Amphibious Assault Ships
Assault Follow-on Echelon
Naval Gunfire
Mine Counter Measures
Amphibious Tactical Support Units
Naval Mobile Construction Battalions
Amphibious related RD&S

(3) Effect close coordination with the Navy in the development of studies relating to the joint amphibious mission.

(4) Identify further areas of study as appropriate.

b. Fleet Marine Force Section (FMF)

The functions assigned to the FMF Section are:

(1) Develop and coordinate the current and future structure of the Air and Ground FMF.

(2) Develop alternate force structures under various constraints for CMC prior to POM preparation.

(3) Coordinate development of priorities for distribution of available manpower resources to the FMF based on approved programs and anticipated requirements.

(4) Review FMF Tables of Organization;

(5) Coordinate with responsible staff agencies to participate in formulation of manpower policies which optimally support Marine Corps requirements.

(6) Review research and development requirements documents to ensure that the capability requirements of the Marine Corps are properly addressed.

(7) Monitor mid and long range policy guidance pertaining to tactics techniques, material, organization, etc., in order to ensure that capability requirements are valid.

(8) Monitor developments intended to satisfy capability requirements which are under the primary cognizance of other Headquarters staff agencies.

(9) Provide guidance to the Marine Corps Studies Program to include identification of major problem areas.

c. General Support Section

The functions assigned to the General Support Section are:

(1) Develop, in conjunction with DC/S Installations and logistics, current and future organizations for general support.

(2) Develop and recommend priorities for the distribution of manpower resources, including civilian, to the command elements of the Marine Corps.

(3) Monitor plans for Military Construction, base closing, real property maintenance, and management information systems.

(4) Monitor training and training support facilities in support of the program.

(5) Monitor current plans and develop operating alternatives to current methods of managing the individuals support line, particularly in the accessions and transients area.

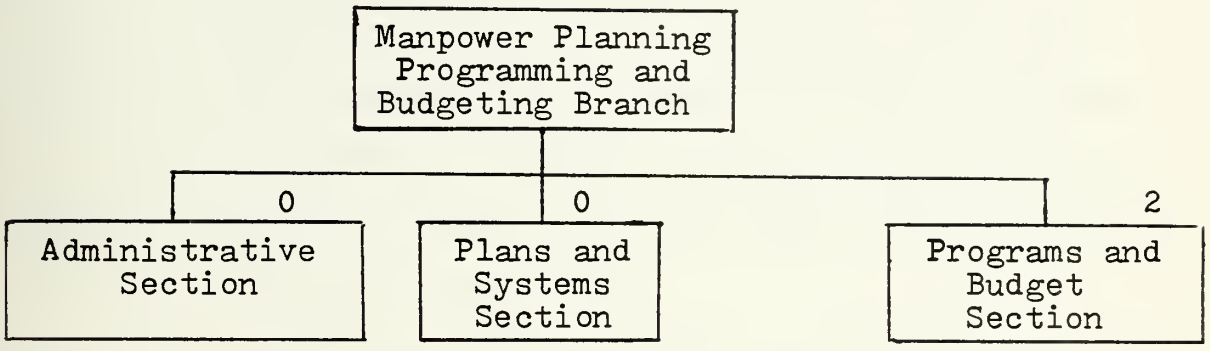
(6) Monitor and review plans for provision of logistics support to the FMF by Non-FMF activities.

B. MANPOWER DEPARTMENT

The Manpower Department has two MOS 9652 billets located in the Manpower Planning, Programming and Budgeting Branch. The Manpower Planning, Programming and Budgeting Branch has the organization shown in Figure 9 with MOS 9652 billets marked:

Figure 9

MANPOWER PLANNING PROGRAMMING
AND BUDGETING BRANCH



Although the Manpower Department has a broad mission relative to personnel and manpower, the Manpower Planning, Programming, and Budgeting Branch deals primarily with Marine Corps manpower plans and programs supporting the Marine Corps PPBS.

1. Programs and Budget Section

The Programs and Budget Section has the primary task of conducting the staff work associated with the following functions:

1. Prepare Marine Corps Manpower plans and programs in support of Marine Corps PPBS as reflected in the annual Joint Strategic Objectives Plan (JSOP), POM, Joint Forces Memorandum (JFM), FYDP, and the various Military Personnel Marine Corps (MPMC) and Operations Marine Corps budget submissions.
2. Prepare the Marine Corps Manpower input to the JSOP and assist DC/S Plans and Operations in reviewing and commenting on the Manpower portions

of the JSOP to include briefing the Commandant prior to JCS approval of the JSOP.

3. Assist DC/S R&P in the development of the manpower portion of the tentative POM for review by the Commandant and by the Secretary of the Navy.
4. In coordination with DC/S R&P review Secretary of Defense Program Planning Guidance (PPG) and Program Change Decisions (PCO) for Marine Corps manpower implications.
5. Assist DC/S R&P with development of manpower portion of the annual POM submission, DC/S Plans and Operations (P&O) with the Marine Corps portion of the JFM and DC/S R&P with out-of-cycle Program Change Requests (PCR).
6. Assist DC/S R&P with review of and reclama to the annual Program Budget Decisions (PBD).
7. Coordinate the manpower inputs to the periodic update of the FYDP directed by PCDs, PDMs or PBDs.
8. Prepare and submit Marine Corps manpower justification and statistics in support of MPMC appropriations in both appropriations budget format and operations budget format.
9. Maintain military manpower statistics for use in budget preparation and force planning, to include retention and loss data.
10. Develop annual program for officer and enlisted manpower.

11. Prepare estimates for and monitor the status of procurement and release of officers and enlisted personnel.
12. Monitor plans for maintaining strength in the top six enlisted pay grades and the promotions of Marines in all pay grades.
13. Monitor special clothing allowances and the clothing budget.
14. Prepare military manpower cost estimates associated with various management alternatives in support of approved plans.
15. Prepare the Director of Manpower Plans and Policy statements for appearances before Congressional committees and coordinate all responses to Congressional committees which pertain to military manpower budgeting.
16. Prepare and present manpower reports concerning strength, accessions, promotions, releases and manpower costs.
17. Monitor for currency and accuracy all military manpower statistics prepared by HQMC staff agencies for release to external agencies.
18. Provide liaison with agencies outside HQMC which have requirements for Marine Corps manpower statistics.

C. FISCAL DIVISION

The two DSA billets assigned to the Fiscal Division are located in the Resource Analysis and Evaluation Section of the Analysis Review Branch.

1. Resource Analysis and Evaluation Section

The Resource Analysis and Evaluation Section has the mission to provide resource analysis support for the development of Marine Corps program, which includes the following functions:

1. Conduct independent evaluation of Marine Corps intrasystem and intersystem studies that are performed by other staff sections of HQMC or external agencies.
2. Conduct force structure analysis to include development and operation of the Marine Corps Force Structure Cost Model.
3. Develop criteria and analytical models to support the requirements of the HQMC staff.
4. Review all DOD/DON requests for cost information and develop data for reply, or refers requests to appropriate staff office for input to data for reply.
5. Review data currently available in existing management information and accounting systems and use this data to evaluate potential resource implications of existing or new programs.
6. Conduct resource analysis in support of high-priority, quick reaction projects of the Commandant (CMC).

7. Monitor, evaluate and submit selected Acquisition Reports for those Marine Corps acquisitions approved under SECNAVINST 7700.5.
8. Develop policy, methodology and procedures for resource analyses within the Marine Corps.
9. Sponsor the DON Cost Analysis Program in the Marine Corps.
10. Advise and assist HQMC staff in the use of resource analysis techniques used in Marine Corps programs.
11. Represent the Marine Corps on the Defense Economic Analysis Council (DEAC).
12. Develop cost factors for use in resource analyses and studies.
13. Provide liaison with other cost analysis offices within DOD/DON components.

D. PLANS AND OPERATIONS DEPARTMENT

The one DSA billet assigned to the Plans and Operations Department is located in the Service Plans Branch of the Plans Division. The mission assigned to the Service Plans Branch is to formulate, recommend and coordinate HQMC staff action related to the development and maintenance of the Marine Corps service plans, current and future, and related Departmental and Navy plans. This mission is accomplished through the following functions:

1. Formulate, recommend and coordinate HQMC staff action related to the development and maintenance of Marine

Corps service plans and plans of Marine Corps subordinate commands prepared in support thereof.

2. Formulate, recommend and coordinate HQMC staff action related to development and maintenance of the Marine Corps Continuity of Operations Plan, and review supporting plans.
3. Develop policy and coordinate HQMC staff action related to development, preparation, promulgation, review and revision for the Marine Corps Midrange Objectives Plan and the Marine Corps Long Range Plan.
4. Formulate, recommend and coordinate HQMC staff action relative to the development and maintenance of the Marine Corps Capabilities Plan, and review supporting plans.
5. Coordinate HQMC staff action in developing Marine Corps inputs to related Departmental and Navy plans.
6. Participate in the review of other service plans, joint plans, and DOD plans related to emergency action, current capabilities, and coordinates the Marine Corps position as required.
7. Formulate, recommend and coordinate policy related to mobilization planning and execution within HQMC.
8. Coordinate Marine Corps policy relating to mid and long range force requirements, deployment and employment.

E. AVIATION DIVISION

The one DSA billet in the Aviation Division is located in the Plans and Readiness Branch. The Plans and Readiness Branch is responsible to plan and initiate staff action to fulfill requirements of Marine Corps aviation units in matters of organization, readiness, deployment, coordinated mobilization planning, and to establish military requirements in design and procurement of new operational equipment. This mission is accomplished through the following functions:

1. Coordinate, review and prepare pertinent portions of short and long range mobilization requirements and capabilities of Marine Corps aviation units.
2. Develop missions and tasks for Marine Corps aviation units.
3. Develop short and long range organizational plans, program objectives, and programs of Marine Corps aviation units.
4. Formulate organizational structure of Marine Corps aviation units, including aircraft complements.
5. Maintain operational readiness data on Marine Corps aviation organizations and recommends employment and deployment.
6. Report on deficiencies of Marine Corps aviation (including delays in the execution of approved programs) and the effect such deficiencies have on the ability of Marine Corps aviation units to carry out assigned tasks.

7. Conduct liaison pertinent to matters concerning organization of the Marine Corps aviation reserve component.

8. Initiate change to SECDEF's Five Year Force Structure and Financial Program to support approved Marine Corps aviation programs. Also monitor changes which have a potential effect on Marine Corps aviation plans and programs.

9. Coordinate matters relative to airspace use in the Marine Corps.

10. Coordinate, review and monitor Marine Corps participation in general naval aviation operating procedures standardization and aviation safety programs.

11. Administer Marine Corps administrative flight operations in the Washington, D. C. area and monitors proficiency of all Marine air crewmembers stationed in the Washington, D. C. area.

12. Monitor ongoing studies which have implications pertinent to Marine Corps aviation.

13. Initiate studies to assist in determining Marine Corps aviation requirements.

14. Coordinate all fiscal matters related to Marine Corps aviation.

15. Provide budget justification data to support Commandant, Marine Corps and DC/S Aviation's appearance at Congressional hearings.

16. Review Congressional (Armed Services and Appropriations) Committee Hearing testimony, correct and coordinate preparation of inserts for the record as required.
17. Review all PCDs, PBDs and Budget Memoranda pertaining to Marine Corps Aviation and prepare responses as required.
18. Coordinate responses to all Naval Audit Reports pertaining to Marine Corps aviation.

F. INFORMATION SYSTEMS SUPPORT AND MANAGEMENT DIVISION

The only billet for a DSA in the Information Systems Support and Management Division is located in the Systems Analysis and Review Section of the Systems Planning, Review and Implementation Branch. The DSA assigned to the Systems Analysis and Review Section can be involved with any of the following functions.

1. Analyze information system development and recommend approval or disapproval.
2. Appraise progress of information system development and provide recommendations.
3. Act as Division focal point for all external review by GAO, Navy Audit Service, DOD and DON.
4. Coordinate Marine Corps implementation of Automatic Data System/information systems directives issued by external higher headquarters.
5. Assist in conducting on-site systems reviews of Marine Corps information systems, to ensure they are in

concert with the overall Marine Corps Automated Data Systems Concept and are supportable on a cost benefit analysis basis.

6. Develop and maintain the Automatic Data Systems Manual.

G. MARINE CORPS DEVELOPMENT AND EDUCATION COMMAND (MCDEC)

There is one MOS 9652 billet in MCDEC. It is located in the Long Range Branch of the Plans and Studies Division. This is the only MOS 9652 billet at a lower organizational level than the HQMC level. An interview with the incumbent to the billet illustrates the fact that this billet supports the Marine Corps PPBS.[30] The major work done by the section is to conduct the Long Range Study from which the Marine Corps Long Range Plan is derived. The billet involves systems analysis work in generating input to the DOD PPBS relative to long range planning in the Marine Corps.

H. OFFICE OF ASSISTANT SECRETARY OF DEFENSE (OASD)

The billet in OASD is in the Program Analysis and Evaluation (PA&E) section. This is one of three MOS 9652 billets which provide Marine Corps representation on staffs of higher level DOD headquarters. The other two billets are in the Defense Communication Agency.

The author was unable to find organization documents which established functional responsibilities. Interviews

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[30]Interview with Major T. Wise, U.S.M.C., incumbent, 22 October 1975.

with officers[31] of OASD (PA&E) indicates that there exists informal internal structure which allows an officer assigned to OASD (PA&E) to conduct studies in specialized areas in which the officers professional interests lie. The incumbent of this billet is one of the three DSAs utilized in MOS 9652 billets. He has specialized in helicopter matters although other areas were available. He has become expert in analysis of helicopter programs in DOD. He indicated that a thorough understanding of systems analysis concepts, language, and tools is the major prerequisite for the billet. Seldom are systems analyses actually conducted at that staff level. The major activity is that of reviewing and interpreting analytical efforts conducted at other levels. Many of the skills required are of the management type rather than the operations analysis type.

I. DEFENSE COMMUNICATION AGENCY (DCA)

Two MOS 9652 billets are located in the organizational structure of the DCA. This is a misleading label, because the two staff sections which have the billets function integrally with the Joint Chiefs of Staff (JCS). One section, Strategic Plans and Policy Division of the National Military Command System Support Center, provides technical analytical support for JCS, J-5.[32] The other section, Strategic Forces Division,

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[31]Interview with Major W. M. Krulak, U.S.M.C., incumbent, 12 September 1975.

[32]Interview with Major M. J. Hanley, U.S.M.C., incumbent, 20 October 1975.

also supports JCS, J-5. The incumbent of the Strategic Plans and Policy Division billet indicated that his division deals with maintaining computerized models for nuclear exchange, nuclear effects, and data base demographics. The duties entail supporting Strategic Planning System (Part of DOD PPBS), supporting international negotiations, supporting Data Management, and supporting special projects.

Of major importance is the ability of the incumbent to understand systems analysis and operations analysis concepts, understand military and analytical terminology, and be able to convert systems concepts into laymans terms. Knowledge of the uses of the computer in problem solving and in data systems applications is very important to the incumbent of this billet.

V. MARINE CORPS PPBS

Review of the functioning of each department or division to which a DSA billet is assigned, reveals that each department or division has some role in the Department of Defense Planning, Programming, and Budgeting System (DOD PPBS). The DOD PPBS interfaces with a similar system in each service. The counterpart to the DOD PPBS in each service generates the requirement for systems analysts in each service. It is important to the understanding of what the DSAs duties entail to understand the Marine Corps PPBS and how it integrates with a similar organization in the Navy and with the DOD PPBS.

The Marine Corps PPBS reflects program budgeting procedures in the Marine Corps which provide planning information for Marine Corps planning, Navy planning and DOD planning. Such an inter-relationship requires mutual timing dependencies and extensive coordination. The Marine Corps PPBS is tailored to meet the timing requirements imposed by the DOD PPBS and also by the Department of the Navy (DON) Planning and Programming System (PPS).[33] The Marine Corps PPBS inputs information through the DON PPS to the DOD PPBS. Since the Marine Corps PPBS is so inter-related to both the DOD PPBS and the DON PPS, it is instructive to review both of these systems prior to examining the Marine Corps PPBS.

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[33]Headquarters Order P3121.2, 4 June 1974.

A. DEPARTMENT OF DEFENSE (DOD) PPBS

The DOD PPBS is a set of formalized management procedures established to ensure that the resources provided for national security are allocated to provide the best possible force to counter threats to the nation's security. The procedure provides for submitting, analyzing, reviewing, and approving new and revised DOD plans, programs, and budgets.[34] The management process is cyclic in nature /See Figure 10/ and has three basic divisions(from which the title is derived): planning, programming, and budgeting. Essentially, it is a series of exchanges (documents) between the Secretary of Defense (SecDef) and the Military Departments/Joint Chiefs of Staff (JCS) in the formulation of the Five Year Defense Program (FYDP) in the order shown below:

1. JCS submits the Joint Strategic Objectives Plan (JSOP) Volume I (entitled Military Strategy and Force Planning Guidance) to SecDef.
2. SecDef enlarges and updates the strategy in JSOP Volume I and issues Defense Policy and Planning Guidance (DPPG) as a basis for force planning.
3. JCS then submits JSOP VolumeII (entitled Analysis and Force Tabulations) which develops major force requirements to support the strategy.
4. JCS submits Joint Research and Development Objectives Document (JRDOD) which establishes R&D objectives in support of the strategy of JSOP.

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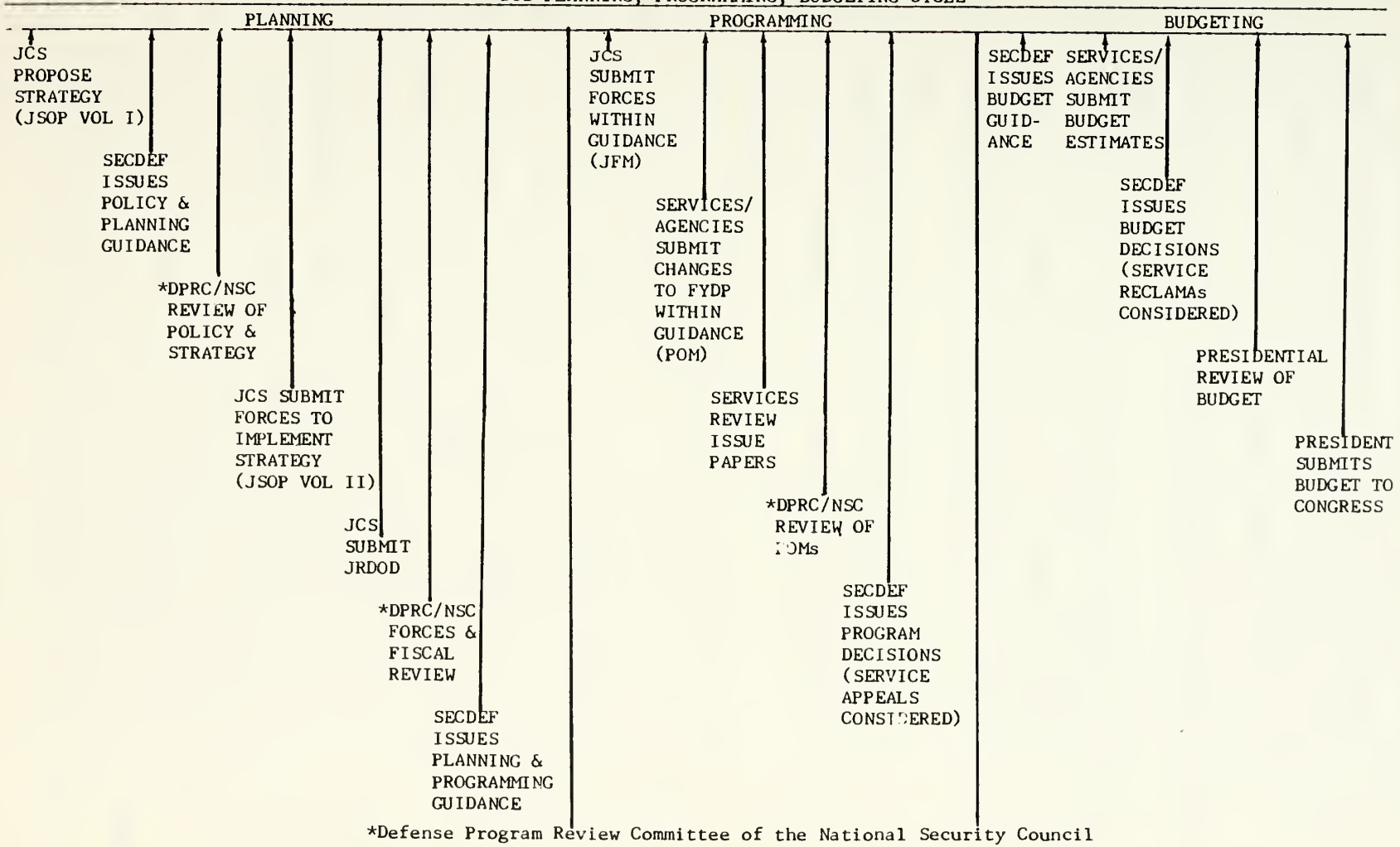
[34]NAVEDTRA 10792-D, 1974.

Figure 10

DOD PPBS Cycle



5. SecDef reviews JSOP Volume II and JRDOD and issues the Planning and Programming Guidance Memorandum (PPGM) which updates and provides additional planning guidance to include guidance on fiscal limitations.
6. JCS submits the Joint Forces Memorandum (JFM).
7. Military services submit Program Objectives Memoranda (POM).
8. SecDef issues tentative Program Decision Memoranda (PDM) for comments by the services and JCS.
9. Services and JCS submit appeals to the tentative PDMs.
10. SecDef issues final PDMs and Budget Guidance.
11. Services submit Budget Estimates based on Budget Guidance.
12. SecDef issues Program Budget Decisions (PBDs).

Figure 11 shows the interactive process in graphic form. The JCS activity which results in the JSOP and other planning documents is a system called Joint Strategic Planning System (JSPS). Documents in this planning system are: Joint Intelligence Estimate for Planning (JIEP), Joint Long Range Strategic Study (JLRSS), Joint Strategic Objectives Plan (JSOP), Joint Forces Memorandum (JFM), Joint Strategic Capabilities Plan (JSCP), and Joint Research and Development Objectives Document (JRDOD). It will be shown later that although many of these documents are not considered to be used directly in the DOD PPBS, they are documents which result from planning interaction between JCS and the services which support the DOD PPBS.

B. NAVY PLANNING AND PROGRAMMING SYSTEM (PPS)

The Navy PPS provides for development of Navy concepts, requirements and objectives. The Navy PPS is responsive to and operates within the functional constraints of both the Joint Strategic Planning System and the DOD PPBS to provide the DON budget submission to the SecDef.

Separately, but in close coordination, both the Commandant of the Marine Corps (CMC) and the Chief of Naval Operations (CNO) develop plans and programs for submission to the Secretary of the Navy (SecNav). The DON Program Information Center (DONPIC) is responsible for maintaining, correlating and displaying program data required by SECNAV, CMC, and CNO to make decisions and take action relative to programs and objectives. DC/S Requirements and Programs is the Marine Corps point of contact with DONPIC.

The DON PPS planning documents generated to support the DOD PPBS and internal Navy planning are: Navy Strategic Study (NSS), Long Range Objectives, Navy Support and Mobilization Plan (NS&MP), and the Navy Capabilities Plan (NCP).

The Navy Capabilities Plan is the Navy's short-range plan supporting the Joint Strategic Capabilities Plan (JSCP) of JCS. It provides direction and guidance for mobilizing, organizing, training, and equiping Naval Forces for combat. It further makes provisions for the administration and support of Naval forces assigned to unified and specified commands.

The Navy Support and Mobilization Plan contains policy guidance for logistic support of mobilized forces and for phase expansion of Navy mobilization. It supports the Navy Capabilities Plan and sets forth the force levels and logistic capabilities for the current fiscal year and the next eight fiscal years.

The Long-Range Objectives (LRO) is the plan which converts the concepts identified in the Navy Strategic Study to qualitative and quantitative force plans. The LRO establishes force structures for up to the eleventh year in the future. It also specifies the research and development effort required to annually update the Navy's general operational requirements.

C. MARINE CORPS PPBS

The Marine Corps PPBS provides procedures for determination of objectives, examination of alternatives, selection of courses of action, and appraisal of progress toward attainment of objectives. The execution of this system coordinates the functions of planning, programming, and budgeting with the systems acquisition process. Planning and programming functions are conducted on a continuing and overlapping basis to emphasize projections into the future from a base of current capabilties. Budgeting is accomplished in one-year segments as an annually cyclical process. The systems acquisition process is oriented toward managing the acquisition of weapon systems and equipment in such a way as to meet Marine Corps objectives while stressing cost-reductions. The terms: planning, programming, and

budgeting are explained to facilitate a better understanding of how they are accomplished.

1. Planning

Planning is conducted to identify and develop courses of action in support of roles, missions, and tasks which will provide the highest contribution toward attainment of the military objectives supporting the national security objectives. The planning function in the Marine Corps is accomplished within the DOD PPBS through participation in the JCS Joint Strategic Planning System (JSPS). Marine Corps planning documents generated included: the Marine Corps Capabilities Plan (MCP), the Marine Corps Midrange Objectives Plan (MMROP), and the Marine Corps Long-Range Plan (MCRP). DC/S Plans and Operations Department coordinates and supervises staff activity in support of DOD PPBS, Director, Plans Division of Plans and Operations Department is responsible for the MCP, MMROP, and MLRP.

The Marine Corps Capabilities Plan covers the Marine Corps' capability to accomplish its statutory mission and assigned tasks during the current fiscal year under all war conditions. The MCP provides guidance and instructions to Marine commands for employment of all resources provided as a result of planning, programming and budgeting decisions. It provides plans for partial and full mobilization to meet the Marine Corps general war posture. The plan includes the concept for mobilizing selected units of the Organized Marine Corps Reserve. The MCP is updated annually.

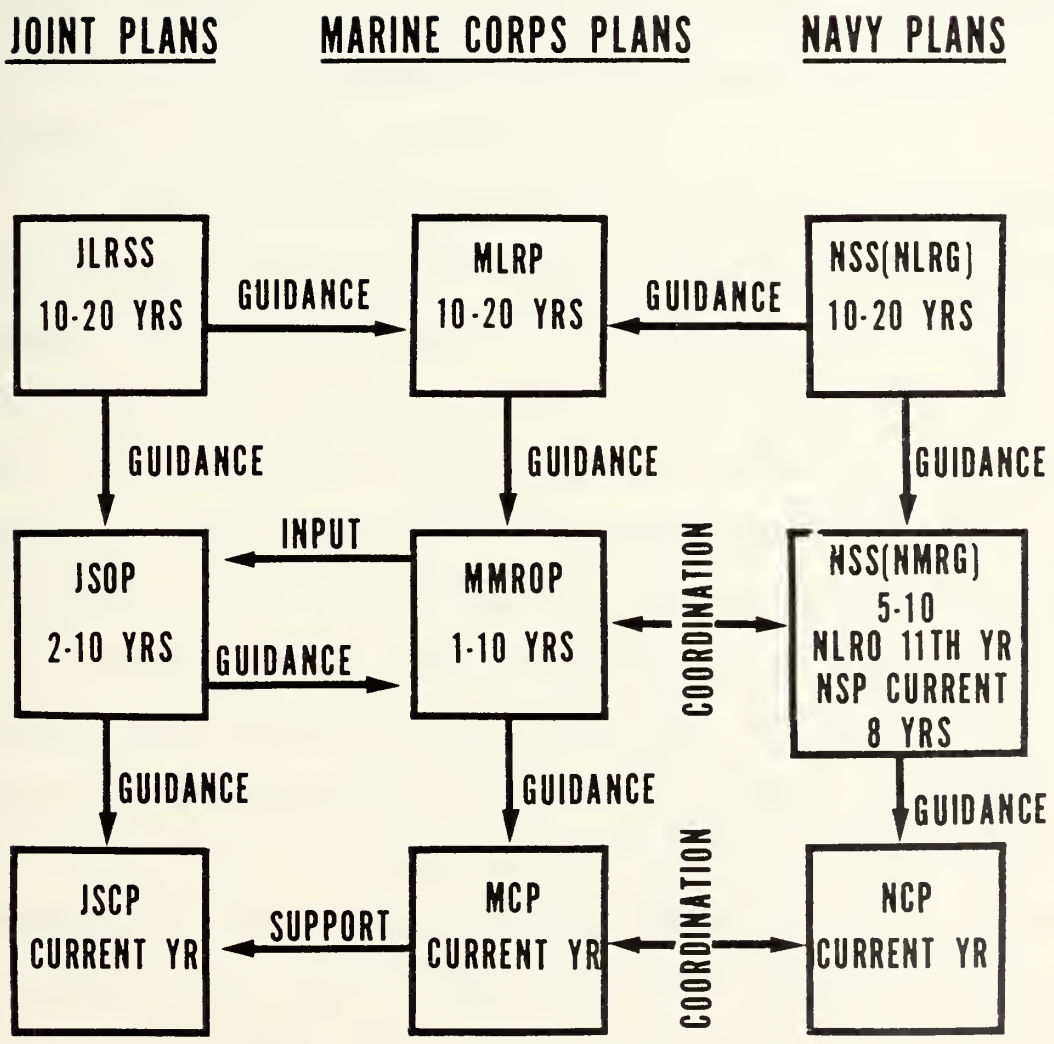
The Marine Corps Mid-Range Objectives Plan develops objectives and requirements necessary to support the Marine Corps statutory missions and associated national strategic objectives over the 10-year period following the fiscal year of publication. This plan, provides the basic objectives plan of the Marine Corps both as an input to the JSPS and as guidance for Marine Corps internal functions. Additionally, it provides information to unified and specified commands, as well as to other DOD agencies. It provides the basis for identifying R&D goals. The MMROP is reviewed and updated annually.

The Marine Corps Long-Range Plan establishes broad concepts and planning objectives which provides direction for the evolutionary development of Marine Corps forces. The MLRP is guided by the Marine Corps Long-Range Study and provides common ground for coordination with other services in defining requirements from 10 to 20 years in the future. This plan treats qualitative goals rather than resource requirements. Although the MLRP is reviewed in total every 5 years, concepts of operation, organizational objectives, and material objectives are reviewed annually.

The development of the three Marine Corps plans is accomplished in coordination with both the Navy and JCS who generate comparable plans. In reality, the plans of the Marine Corps, the Navy, and JCS are interactive in that each provides guidance and information for the others. The interactive nature of Planning is shown by Figure 11.

Figure 11

Planning Interaction



2. Programming

The programming phase of the Marine Corps PPBS has as its objective to translate approved Marine Corps concepts and objectives into a force structure defined in terms of men, material and monies within a specific timing scheme. Ultimately the product of the Marine Corps PPBS is input to the DOD FYDP. However, because the Marine Corps is an element of DON, the Marine Corps input to the DOD FYDP is submitted to DOD in the DON Program Objectives Memorandum (POM). The DON POM inputs to the FYDP the programming effort of the entire DON, including the Marine Corps' programming input.

The programming phase begins early in the calendar year with DOD promulgation of the Planning and Programming Guidance Memorandum (PPGM) which provides: Final Policy and Force Planning Guidance, Final Material Support Planning Guidance, Fiscal Guidance, POM Submission Guidance, and other Guidance. The all-important Fiscal Guidance specifices the allocation of resources which are assumed to be available to the Defense Program. It further identifies specific Total Obligational Authority (TOA) and Outlay by fiscal year for each military department and defense agency. The structure of the document is fiscal guidance by Major Mission and Support Categories. The Guidance for POM Preparation is designed to insure that the Service POMs provide an adequate description of proposed forces and programs, the rationale for proposing these forces and programs, and the readiness and capability of those forces.

Each department and defense agency submits a POM in May which proposes the organizations costed force structure for the next five years and its uncosted force structure for three more years. The POM is the result of each organizations effort to determine what man-machine systems can most economically accomplish assigned missions.

Programming activity in the Marine Corps is a dynamic process which is accomplished in four phases:

1. The Assessment and Review Phase commences as soon as the preceding year's POM has been submitted. It establishes the base for programming, identifies major problem areas, and establishes new initiatives. It usually runs from July to October.
2. The Initial Development Phase runs from October to February and has as its objective to develop an unconstrained program. It develops alternatives to satisfy various possible constraints and new initiatives. It terminates with receipt of Planning and Programming Guidance.
3. The Final Development Phase runs from February to April and is devoted to program guidance analysis and preparation for Marine Corps program proposals. It ends with publication of Commandant of Marine Corps (CMC) program decision.
4. The Decision Phase runs from April to August and is devoted to preparation and submission of the POM input, resolution of major issues and appeal

action as required. This phase ends with receipt of final SecDef Program Decision Memorandums.

3. Budgeting.

The last step in the PPBS cycle is the budget. The budget is the expression in financial terms, organized by appropriation and fund structure, of a plan for carrying out approved program objectives (approved by POM & PDM) for the fiscal year under consideration. The Comptroller of the Navy provides policy guidance and direction. CMC and CNO as operating executives are responsible for budget preparation for the Marine Corps and the Navy respectively. Upon receipt of initial instructions (approximately June) the staffs of CNO and CMC have the information required to base budget estimates. When the budget estimates are completed, they go to the Comptroller of the Navy for review. The review includes informal talks with the HQMC staff, as required. After this review the DON budget estimate is forwarded to DOD where further review takes place. The Secretary of Defense reviews the DON budget estimate and makes tentative Program Budget Decisions which establishes his decisions relative to the services budgets. The services have the right of reclama and the right to offer alternative proposals. If no reclama is made by the service, the PBD becomes final and is the basis for the DOD budget submission to the President through the Office of Management and Budget (OMB). The budget is reviewed at the OMB level and when approved becomes part of the Presidents' budget which goes to Congress

for further review. Congress conducts the final review and acts on the President's budget.

Throughout this budget formulation process various staff sections of HQMC are required to interact by presenting justification dialogue, and cost figures to the Navy, DOD, OMB and Congress. DC/S R&P, in coordination with Fiscal Director of the Marine Corps (FDMC), provides the policy direction and supervisory control in the formulation and documentation of costs required in the planning and programming process. This is true with the exception of costs involved with RDT&E programs which are under the purview of DC/S Research, Development and Studies Division (DC/S RD&S). All external distribution of cost data is made by DC/S R&P who maintains Marine Corps liaison with DONPIC. DC/S Manpower determines total manpower implications for program-costing purposes. The Director of Information Systems Support and Management Division is responsible for providing automatic data processing support for computerized costing.

The Marine Corps PPBS involves a highly complex set of interactions conducted at HQMC level with both internal and external organizations. The DSAs involvement with this system in each of the 16 MOS 9652 billets makes the Marine Corps PPBS an important area of study for the prospective DSA.

VI. PROFILE OF THE DSA

Drawn from elements of the previous analysis, this section presents a profile of the Defense Systems Analyst (DSA). This is accomplished without the aid of a statement of the Marine Corps objective in establishing the DSA specialty. The profile is generated, then, through inferences made from the manner in which the Marine Corps utilizes the DSA. In that regard, the presentation is made from three perspectives to illustrate that the Marine Corps does not utilize the DSA in a narrow role. The perspectives from which the DSA is viewed are: as a Marine Corps expert, as a military systems analyst, and as a headquarters staff action officer.

Knowledge that the DSA is a primary actor in each of these roles avoids any confusion that might result from thinking that he acts only in one specific capacity. In each of the MOS9652 billets the DSA functions as a combination Marine Corps expert, systems analyst and staff action officer. Some billets may stress conducting systems analyses. Other billets may stress the capability to interpret systems analyses to laymen. Still other billets might stress staff coordination. Although each type of MOS 9652 billet emphasizes a different skill, each requires some understanding of systems analysis. The importance of understanding that the DSA is a multi-skilled officer is discussed in following paragraphs.

A. MARINE CORPS EXPERT

Of fundamental importance is the idea that the DSA be a Marine Corps officer. This stems from the fact that systems analysis is a conceptual framework which can be imposed around a problem peculiar to any specific environment. Thus, in addition to being expert in the understanding and employment of systems analysis one must have expertise in understanding all the ramifications of the particular problem being analyzed. It is because of this lack of understanding of the ramifications of the military problems that some systems analytical efforts have proven unsatisfactory. Although thorough understanding of systems analysis can go a long way to eliminate technical errors, an analysis based on unrealistic assumptions can be technically perfect and still be of no value to the decision-maker.

It is clear, then, that effective systems analytical efforts in the Marine Corps result from detailed knowledge of the Marine Corps. This detailed knowledge must include knowledge of missions, organization and method of operation of the Marine Corps. Because the analytical effort deals with comparing weapons systems, knowledge of the environment and problem areas associated with combat arms and combat forces is essential. Because part of the comparison of weapons systems deals with support systems, knowledge in that area is also important. Although no single officer can be expected to have intimate knowledge in all these areas it is safe to say that a mixture

of Marine officers with backgrounds in these areas can provide the Marine Corps expertise required for effective systems analytical efforts.

B. MILITARY SYSTEMS ANALYST

By education and definition the Defense Systems Analyst is a systems analyst and in particular, a military systems analyst. As a systems analyst he is an expert in understanding the general concept of systems analysis and the tools of systems analysis. Within the framework of systems analysis he has expertise in dealing with the class of problems peculiar to military systems analysis. The military systems analyst deals with the problem of achieving maximum effectiveness (benefit) for a given cost of a system or its alternatives. The cost-effectiveness problem can be a comparison of specific weapons systems through comparison of military results for the same cost or a comparison of different programs which can solve a problem equally well but with different costs.

Although the previous discussion illustrates that the DSA is capable of conducting systems analyses, he is not utilized extensively in the Marine Corps to conduct systems analyses. In the Marine Corps, which has very austere staffing of systems analysts, the DSA more often evaluates studies conducted by others and provides assistance in authenticating the assumptions utilized and in interpreting the results for others. He makes available to other staff sections his knowledge as a systems analysis expert for the purpose of interpreting

analyses which may come in through other DOD agencies. He further provides valuable assistance in conceptualizing the nature of problems which come up in the routine of daily staff action. This capability is derived from his systems analysis training.

The DSA fulfills an analytical role in actions taken incident to the conduct of the PPBS cycle in the Marine Corps. In each section to which he is assigned the DSA is tasked with some analytical effort in support of the particular phase of planning, programming or budgeting. The involvement may be either that of conducting a cost-effectiveness study or of analyzing an initiative put forth by a separate staff agency. The involvement in PPBS is so wide ranging as to require an understanding of the processes and analytical procedures used in other services and in the Office of the Secretary of Defense (OSD). Indeed, some of the billets pertinent to PPBS are in OSD and in other Defense Agencies.

C. STAFF ACTION OFFICER

The DSA has a major role as a Headquarters staff action officer. This is an important role which, unfortunately some DSAs do not recognize as being a legitimate role for a graduate-educated officer. Such an individual feels that perhaps education may not have been warranted because he is functioning as a staff action officer which is a role that a nongraduate-educated officer can fill. Although this may appear true on the surface, there is a payoff in that the

graduate-educated officer brings to his duties as a staff action officer an additional set of skills and conceptions which allow him the potential of higher achievement as a staff action officer. The result is a staff action officer who has an understanding of the concept and language of systems analysis as well as a wide understanding of the PPBS and its language. He is a Marine Corps expert, a staff action officer and a Military Systems Analyst. In the authors opinion, the synergistic effect makes him an officer with the potential to be able to perform better in all three areas.

Because most of the systems analysis conducted by a DSA is within the purview of the PPBS and is toward the end of solving the defense allocation problem, the DSA should be thoroughly familiar with all the processes carried on under the PPBS. This intimate knowledge of the PPBS cycle is almost a requirement for effective staff action in the staff sections in question. Information concerning the PPBS gained in the graduate education process is required information even for the staff action officers in the PPBS dedicated staff sections. A nongraduated-educated officer would have to take valuable time for on-the-job training to gain the required knowledge of the PPBS. In such an environment the learning process may well take a longer period of time and have the additional shortcoming of teaching the flaws in the system as part of the system. On the other hand, an officer aware of theory of the system can see the flaws and be alert to opportunities for corrective action.

The number of staff offficers assigned to the staff sections dedicated to PPBS actions is small. The functions that are performed are many and have serious consequences with respect to the structure of the Marine Corps. As a consequence, it is obviously important that the officers assigned to conduct these PPBS functions be as thoroughly trained as possible in the areas of Marine Corps expertise, systems analysis, DOD PPBS, Navy PPS, and Marine Corps PPBS.

VII. EDUCATING THE POTENTIAL DSA

This chapter examines two educational programs which have been used to educate the potential DSA. The current curriculum used at the Naval Postgraduate School (NPS)[35] is compared and contrasted with the curriculum used in the past at the University of Rochester[36] to educate DSAs. The Chapter accomplishes the analysis in the following steps:

1. Presentation of the University of Rochester curriculum in Systems Analysis.
2. Presentation of the NPS curriculum in Managerial Economics/Administrative Science.
3. Comparison of the two curricula with respect to the number of total classroom hours of instruction.
4. Comparison of course content of the courses in the curricula on the basis of catalogue course descriptions.
5. Describing beneficial areas of study beyond systems analysis.

The University of Rochester Curriculum in Systems Analysis is used as a model systems analysis program. The author chose it as a model because it appears to be a tested program. The author could find no criticism of the curriculum either in the files of the discipline sponsor or in interviews with graduates

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[35]Current DSA Curriculum [See Appendix B].

[36]Official Bulletin, University of Rochester Graduate Studies 1971-72.

who have had an opportunity to use the skills developed in the curriculum. Two criticisms of the University of Rochester program surfaced, but both were with respect to the administration of the program. The first criticism was that it had stiff entrance requirements which made it difficult for prospective students to matriculate. The second criticism was that the cost of the program was excessive. Because neither of these criticisms bear on the curriculum content of the University of Rochester program, the author felt that University of Rochester curriculum presented a good model for comparison. Another positive factor which makes this a model curriculum is that it chose as an educational objective[37] to develop decision making and analytical competence rather than functional specialization. Thus; the University of Rochester curriculum can be considered a systems analysis curriculum which restricted itself to developing primarily systems analysis abilities.

Differences between the Rochester program and the NPS program make the two programs difficult to compare. The major differences are in the following areas:

1. The University of Rochester curriculum required twelve months of classwork at the University of Rochester and three months of "experience" work at the Center for Naval Analyses (CNA). The academic year is three Trimesters.

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[37] Ibid.

2. The NPS requires up to 18 months of classwork during which time a thesis must be completed. Also, the curriculum begins with certain undergraduate courses providing a "fundamentals" program for those requiring it. The academic year is four quarters.

The author has equated the "experience" portion of the University of Rochester program with the thesis requirement of the NPS program. This appears to be a reasonable equation because the "experience" portion of the University of Rochester program[38] is similar to the research portion of the thesis requirement in the NPS program.

The University of Rochester's trimester year had three semesters of 14 class weeks each. The NPS year has four quarters of 11 class weeks each. The difference must be taken into account when comparing courses in the two systems because a one-semester course has more classroom instruction than does a one-quarter course. The difficulty is overcome by comparing classroom hours of instruction in the two systems. For instance, a four-credit course provides 44 hours of classroom instruction (4 hrs. x 11 weeks) in the quarter system while a three-credit course provides 42 hours of classroom instruction (3 hrs x 14 weeks) in the semester system.

The University of Rochester curriculum had only graduate-level courses while the NPS curriculum begins with a "fundamentals" portion which includes some undergraduate-level courses.

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[38]Interview with Professor M. J. Bailey confirms this as a reasonable assumption.

The author felt that the "fundamentals" portion of the NPS Curriculum is very desirable because it overcomes a problem that was evident in the University of Rochester Program, the stiff entrance requirements. The "fundamentals" portion of the NPS curriculum allows for relaxed entrance prerequisites because the incoming student has refresher courses available as part of the normal curriculum. A validation procedure allows the student to bypass fundamentals courses in which he has had more recent experience. The validation opportunity allows some students the opportunity to take more elective coursework or to graduate a quarter or more early.

A. UNIVERSITY OF ROCHESTER CURRICULUM

The University of Rochester curriculum for a Master of Science Degree in Systems Analysis contained nine required courses and three elective courses. These twelve courses produced the 39 semester hours of graduate instruction required to meet the University of Rochester requirements. The courses are listed along with the credit hours attributable to each in Figure 12.

The nine required courses are considered, by the author, to be the minimum essential courses required to fulfill the educational objective of the University of Rochester to educate a systems analyst. The content of the nine courses in this program are assumed, by the author, to supply the minimum essential training for a military systems analyst. This assumption appears valid by the fact that the University of Rochester Program was the outgrowth of the ideas of military

Figure 12

UNIVERSITY OF ROCHESTER CURRICULUM

Required Courses

Credits		
4	BEC 403	Managerial Economics
4	QNT 401	Mathematics for Mangement Science
4	QNT 405	Statistics
3	BEC 404	Theory of the firm
3	LPP 450	Systems Analysis Workshop
3	QNT 441	Introduction to Mathematical Programming
3	QNT 423	Elements of Econometrics
4	LPP 420	Criteria for Public Expenditure
3	LPP 451	Systems Analysis Workshop II
31		

Electives

9	Three electives from list	
	LPP 412	Theory of Political Decision Making
	LPP 414	Economic and Social Policy
	LPP 415	National Security Objectives
	BEC 422	The Economic Environment of Business
40		

systems analysis experts, such as Professor Alain Enthoven.[39] This core of nine courses is the model by which the systems analysis portion of the curriculum at the Naval Postgraduate School is judged.

The options for electives in the University of Rochester program are not considered as being essential courses for all military systems analysts, but are courses which military systems analysts would find helpful. It is at this point that the author stopped using the University of Rochester curriculum as a model for comparison. This analysis assumes that the specific needs of the Marine Corps dictates a list of possible electives and that the individual interests of the students can be exercised. Along with this assumption goes the provision that the Marine Corps provide individual guidance to the student to locate the most probable billet assignment in enough time for the individual to make elective choices which can prove directly beneficial in the next billet assignment.

B. NAVAL POSTGRADUATE SCHOOL CURRICULUM

The Naval Postgraduate School curriculum for a Master of Science in Managerial Economics/Administrative Science is the curriculum currently in use to train prospective DSAs for the Marine Corps (See Appendix B). The curriculum is considered to be flexible and can, within certain academic constraints be adjusted to meet the identified needs of the Marine Corps

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[39]Interviews with Professors P. Parker and M. J. Bailey.

in educating potential DSAs. It is basically an adaptation of the existing Management Science Curriculum #817. The deviations from the Management Science curriculum has not generated the need to go outside the Operations Research/ Administrative Science Department to fulfill the curriculum requirements of the Managerial Economics/Administrative Science curriculum. The Managerial Economics/Administrative Science curriculum is shown in Figure 13.

C. COMPARISON OF TOTAL CLASSROOM INSTRUCTION

It becomes quite obvious from Figure 13 that there is a large difference in number of classroom hours of instruction in each program. Part of the reason stems from the fact that the University of Rochester program has 11 months of classwork while the Naval Postgraduate School has 18 months of classwork. Although the Naval Postgraduate School has a thesis requirement which has been equated to the three month "experience" training in the University of Rochester program, the student at the Naval Postgraduate School attends classes for the whole 18 months. He attends classes during all of the six quarters, even during the quarters in which he is conducting his thesis research.

Because the University of Rochester utilizes a trimester system and the Naval Postgraduate School utilizes a quarter system with four quarters to the academic year, adjustments must be made when comparing credit hours between the two institutions. For the purposes of this study, the usual

Figure 13

MANAGEERIAL ECONOMICS/ADMINISTRATIVE SCIENCE CURRICULUM

Credits	Required Courses
2	MA2040 Matrix Algebra
3	MA2035 Differential Calculus
4	MN2031 Economic Decision Making
4	MN2106 Individual and Group Behavior
4	MN2150 Financial Accounting
2	MA2306 Integral Calculus
19	
4	ГЗ3005 Probability
4	MN3105 Organization and Management
4	MN3140 Microeconomic Theory
4	MN3161 Managerial Accounting
4	MN4154 Seminar in Financial Accounting (Government)
4	SM3371 Methods and Practices of Procurement and Contract Administration
4	MN3211 Operations Analysis For Management I
4	MN3172 Public Policy Processes
0	CS0113 Cobol Programming
4	MN3212 Operations Analysis for Management II
4	MN4145 Systems Analysis
4	MN4181(or elect) Applications of Management Into Systems
4	MN3183 Management Information Systems and the Computer
4	MN4105 Management Policy
4	OA4614 Methods and Practices of Systems Analysis
52	

Electives

8	Two Free Electives.
4	One Elective from List A SM4304 Seminar in Acquisition Management MN4161 Controllership MN4152 Decision making for Financial Management MN4151 Internal Control and Auditing
4	One elective from List B
16	MN3760 Manpower Economics MN4191 Decision Analysis OA4613 Theory of Systems Analysis

formulas for transferring credits is not used. The author's objective is to develop a basis for comparing the amount of classroom instruction available in the University of Rochester curriculum with the amount of classroom instruction available in the NPS curriculum. The number of credit hours assigned to a course reflects the number of hours the course meets each week. To determine the total number of instructional hours in the course, one only needs to multiply the credit hours assigned to the course by the number of weeks the course meets. With 14 weeks in a semester at the University of Rochester, the 40 Credit hours yield 560 hours of class room instruction. The Naval Postgraduate School has 11 week quarters, so the 88 credit hours yield 968 hours of classroom instruction. This is misleading because the University of Rochester curriculum has all graduate-level courses while the NPS curriculum has 19 credit hours of undergraduate work in the "fundamentals" portion of the curriculum. Ignoring this undergraduate work and comparing just graduate course work in the two curricula, changes the comparison a little. The Naval Postgraduate School has 69 graduate credit hours yielding 759 classroom hours of graduate-level instruction. Thus, the NPS curriculum produces 759 hours of graduate-level instruction while the University of Rochester curriculum produces 560 classroom hours of graduate-level instruction.

D. COMPARISON OF COURSE CONTENT

This portion of the curricula analysis compares each of the core courses of the University of Rochester curriculum with a representative course in the NPS curriculum. The comparison is made on the basis of course descriptions taken from the catalogues of both schools. The objective is to assure that each of the core courses of the University of Rochester curriculum is covered in course content and amount of instruction. This comparison assures, at the outset, that those University of Rochester courses which are identified as the backbone of military systems analysis are duplicated in the NPS curriculum. Additionally, the classroom hours of instruction for each course gives assurance that a comparable amount of instruction is given in each course.

The comparison of course content is made difficult because only course descriptions were available to the author for comparing courses. Errors can result from a too general description of courses or from outdated course descriptions available in catalogues. Another difficulty lies in the overlap of courses: the content of one course may cause a minor overlap into another course and the course description doesn't always signify where the in-depth treatments is given. Sometimes courses are compared on the basis of a general description, which may lead to judgmental errors. The author has made a detailed analysis of course descriptions and identified those which he judged to be comparable. Additionally, the overall

programs are analyzed in the light of the topics under the course descriptions to assure that subject topics are covered even if done elsewhere in the curriculum. The course descriptions are duplicated in Appendix F. Figure 14 illustrates the comparison of core courses of the University of Rochester program to comparable courses in the Naval Postgraduate School curriculum.

Review of Figure 14 shows that there were two lengthy courses in the University of Rochester curriculum which have no direct counterparts in the Naval Postgraduate School curriculum. Managerial Economics (BEC403) is a graduate level course which analyzes business problems in terms of economic principles and methods. This marriage of economics and business has no counterpart in the NPS curriculum, although the gamut of business problems are studied in several management and accounting courses. Also, Introduction to Econometrics (QNT 423) has no apparently comparable course in the NPS curriculum. The econometrics course marries economic theory with probabalistic and statistical models. Again, the NPS curriculum offers courses which utilize probabalistic and statistical models but not in conjunction with economic theory. Another shortcoming of the NPS curriculum is that the courses do not treat several of the topics of the University of Rochester program. Although linear programming is taught in the NPS curriculum the concept of "duals" and their use is not discussed. The linear programming coverage stops at graphic solutions. Similarly, dynamic and nonlinear programming

Figure 14

CURRICULA COMPARISON

University of Rochester			NPS Curriculum		
Core of Courses			Comparable Courses		
BEC403	Managerial Economics	(56)	None Comparable		
QNT401	Mathematics For Management Science	(56)	MA2040	Matrix Algebra	(22)
			MA2305	Differential Calc	(33)
			MA2306	Integral Calc	(22)
QNT405	Statistics	(56)	PS3005	Probability	(44)
			MN3211	OA For Management I	(44)
BEC404	Theory of the Firm	(42)	MN3140	Microeconomic Theory	(44)
LPP450	Systems Analysis Workshop	(42)	MN4145	Systems Analysis	(44)
QNT441	Intro. To Mathematical Programming	(42)	MN3212	OA For Management II	(44)
QNT423	Elements of Econometrics	(42)	None comparable		
LPP420	Criteria for Public Exp.	(56)	MN3172	Public Policy Process	(44)
LPP451	Systems Analysis Workshop	(42)	OA4614	Methods and Practices of SA	(44)
	TOTAL	464			385

are not treated at all. There are courses, such as Operations Analysis for Management I and II in which one instructor might introduce one or more of these mathematical programming techniques and another not.

One should note in the comparison of Figure 14 that only 385 classroom hours of instruction out of 968 classroom hours of instruction in the NPS curriculum have been used, so there are 583 (968-385) hours of classroom instruction left. Part of these 583 classroom hours of instruction can be reprogrammed to rectify the shortcomings noted in the previous chapter. Based on 44 (4 hrs x 11 wks) classroom hours of instruction per course, it takes 88 (2 x 44) classroom hours to be reprogrammed to cover Managerial Economics and Elements of Econometrics. The remaining 495 (583-88) classroom hours of instruction can be utilized to develop the potential DSA in other areas. For instance, the interdisciplinary nature of military systems analysis makes it important that the prospective DSA receive instruction in other than just analytical areas. The next problem is to identify, in a systematic way, those areas in which it would be fruitful, with respect to the Marine Corps, for the remaining 495 classroom hours to be spent.

E. BEYOND SYSTEMS ANALYSIS

There are many possible criteria to use in determining how the remaining instructional time should be used. The author has chosen to derive the criterion for course selection from the nature of the DSAs duties. The environment in which the

the DSA must work defines some areas that should be studied by the prospective DSA. Because the DSA must either conduct or evaluate analyses, he should know the general way in which the data is generated. The study of financial, managerial, and government accounting would develop his understanding of how the costs, with which he deals, are formed. This study would show how business transactions are handled in both the private and public sectors. Thus, he would have some understanding of the problems of both the defense contractor and the government.

The DSA deals with program budgeting on the DOD, Navy, and Marine Corps level in the PPBS System, so knowledge of the PPBS on each of these levels is valuable. Thus, PPBS processes on all three levels provides a worthwhile area for further study.

The data used by the DSA is stored and manipulated through the use of automated data systems. The strengths and shortcomings of data systems in serving the analyst are important. So, this area provides a candidate area for further study.

Understanding the way in which organizations function and are controlled is an area of importance to the DSA. In his role as problem formulator, the DSA should be able to determine what problems are generated as a result of disfunctioning of control mechanisms in organizations.

The DSA deals with studies pertinent to the acquisition of new weapons systems. Knowledge of the weapons acquisition process in DOD and the Marine Corps would be beneficial in

this regard. Part of the decision process of PPBS is to develop the manpower allocation plan in DOD. Included must be some understanding of the impact of the All-Volunteer Service personnel policies currently in effect. The study of manpower economics would introduce the prospective DSA to consideration of these aspects of the force structure problem. The areas defined for possible study in the previous paragraphs are not exhaustive but they do cover the major areas that would be of interest to DSAs. In proposing a different curriculum, these areas of interest to the DSA are addressed by coursework. The attempt is to cover them with at least one course unless there are so many facets to a particular subject that more than one course is required.

VIII. A NEW CURRICULUM PROPOSED

The new curriculum proposed in this section draws heavily from the previous curriculum for DSA training at the Naval Postgraduate School (NPS). Analysis conducted earlier showed the previous curriculum at the NPS to be quite strong, but lacking two courses in the area of systems analysis when compared with the University of Rochester curriculum. For that reason the previous NPS curriculum was used as a base and changes were made to correct the deficiencies noted. Additional changes resulted from the author utilizing the areas for additional study as previously identified. These areas for study such as information systems and accounting, provided an additional standard. The author chose a priority system and the proposed curriculum reflects it. The first priority was to bring the systems analysis area up to standard of the University of Rochester curriculum. The second priority was to provide required course work to introduce each area identified earlier as being an important area for the DSA to study. The last priority was to provide elective courses to allow the student the latitude to take additional coursework in either systems analysis or the other previously defined areas. The list of electives is lengthy even though the proposed curriculum provides only two elective options. This was done to provide recommendation of valuable coursework

for the student who validates a "fundamentals" course and has time available for additional coursework.

A. CURRICULUM CHANGES

Figure 15 presents the proposed curriculum. The previous shortcoming in the areas of Managerial Economics and Econometrics are rectified by the addition of Managerial Economics (MN3143) and Investigative Methods of Economics I (MN3645), respectively. Of course, the addition of these two courses required other adjustments. Organization and Management (MN3105) was dropped completely because, in the authors experience, its function is accomplished by business, accounting and economics courses which remain in the curriculum. Applications of Management Information Systems (MN4181) was switched from being "required" to being an "elective." These changes corrected the shortcomings noted in the systems analysis area.

The next step was to assure that each area for further study was covered by at least an introductory course. At least an introductory course was considered to be required in each of the areas of study previously defined. Further depth in each of these areas is to be accomplished by elective courses from the selection provided in lists A and B. The author provided for only two electives because such a limitation was required to assure the desired level of coursework. Additionally, the limitation provides motivation for the student to validate as many of the fundamental courses as is practicable in the first two quarters to gain the opportunity for additional electives.

Figure 15

PROPOSED CURRICULUM

	CR	Number	Course Title
I	2	MA2040	Matrix Algebra
	3	MA2305	Differential Calculus
	4	MN2031	Economic Decisionmaking
	4	MN2106	Individual and Group Behavior
	4	MN2150	Financial Accounting
	0	MN0001	Lecture Seminar
II	2	MA2306	Integral Calculus
	3	PS3005	Probability
	4	MN3143	Managerial Economics
	4	MN3140	Microeconomic Theory
	4	MN3161	Managerial Accounting
	0	MN0001	Lecture Seminar
III	4	MN3172	Public Policy Processes
	4	MN3211	Operations Analysis for Management I
	4	MN3645	Investigative Methods for Economics I
	4	MN4154	Seminar in Financial Managment (Financial Management in the Navy)
	0	CS0113	Cobol Programming
	0	MN0001	Lecture Seminar
IV	4	MN3212	Operations Analysis for Management II
	4	MN4145	Systems Analysis
	3	MN3950	Workshop in Management (Marine PPBS)
	4	MN/SMxx	Elective A
	0	MN0001	Lecture Seminar
V	4	MN3183	Management Information Systems and the Computer
	4	MN/OAxx	Elective B
	0	MN0810	Thesis Research
	0	MN0810	Thesis Research
	0	MN0001	Lecture Seminar
VI	4	MN4105	Management Policy
	4	OA4614	Methods and Practices of Systems Analysis
	4	SM3371	Methods and Practices of Procurement and Contract Administration
	0	MN0810	Thesis Research
	0	MN0001	Lecture Seminar

Figure 15 (Continued)

	CR	Number	Course Title
Elective A	4	SM4304	Seminar in Acquisition Management
	4	MN4152	Decision Making for Financial Management
	4	MN4151	Internal Control and Auditing
	4	MN3124	Analysis of Bureacracy
	4	MN4162	Cost Accounting
Elective B	4	MN3760	Manpower Economics
	4	MN4191	Decision Analysis
	4	OA4613	Theory of Systems Analysis
	4	MN4645	Investigative Methods of Economics II
	4	MN4941	Microeconomic Theory and Policy
	4	MN4920	Public Expenditure Analysis

Accounting is a discipline which is of major importance to the DSA because "cost" which he uses in his analysis is recorded and reported in an accounting system. This is so broad an area that a fundamental course in Financial Accounting is presented. Managerial Accounting introduces analytical techniques and costing. Government accounting completes the introduction of the fundamental accounting coursework. It is because this is a broad topic and because it is a keystone discipline that three courses are required to give the treatment that accounting requires. Additional depth can obtained by choosing as an elective Cost Accounting (MN4162).

The Defense Systems Analyst literally owes his job to program budgeting so this is judged by the author to require complete coverage. Public Policy Processes (MN3172) presents program budgeting and the program budgeting system in DOD: the DOD Planning, Programming and Budgeting System (PPBS). But, considering that the primary duty of the DSA is to provide systems analytical expertise in the PPBS at HQMC level, it is important that he further understand the Department of the Navy Planning and Programming System (PPS) and the Marine Corps PPBS. The DON PPS processes are the subject of Seminar in Financial Management (MN4154), so it is included as a required course. No course currently exists which has as its subject the Marine Corps PPBS processes. A new course is proposed to rectify this shortcoming of the curriculum. Entitled workshop in Management (Marine PPBS Process), MN3950 is described in

later paragraphs. MN3950 concludes the required treatment of PPBS.

An area of study of primary importance to the DSA is automated management information systems. Managment Information Systems and the Computer (MN3183) and COBOL Programming (CS0113) provide the introduction to automated data systems and to a programming language. Further study can be accomplished as desired by the student by taking Application of Management Information Systems (MN4181).

The area of manpower economics is not covered by required coursework even though it was outlined as an area of study that the Defense Systems Analyst would find beneficial. This area is covered by having Manpower Economics (MN3760) as an elective. In the authors' judgement, the other required courses have greater priority when determining what courses should be required.

B. WORKSHOP IN MANAGEMENT (MARINE CORPS PPBS)

This section outlines the authors proposal of course content for a new course in the curriculum. The course is a capstone of the PPBS study. It is designed to give the student an opportunity to study the interactive processes which staff sections of HQMC go through in generating PPBS actions. This course reflects the opinion shared by the author and others assigned to DSA billets that a previous study of the Marine processes of PPBS is important prior to assignment to the PPBS billets.

The course should begin with a brief review of DOD PPBS and DON PPS with an emphasis on input points for Marine Corps inputs and on the timing requirements for the inputs. This analysis should locate and define the overall Marine Corps responsibility to provide information to the DOD PPBS.

Next the staff organization in the Marine Corps which is dedicated to PPBS actions should be identified. Once identified, these staff organizations' missions and functions should be explained in detail. Lines of interaction could be studied to establish how the information and analyses flow to the decision-maker. Levels of decision making should be identified.

The information systems which provide and process the information utilized in the PPBS process in DOD, DON and the Marine Corps should be studied by the DSA. Understanding of these data systems would give the prospective DSA a clearer picture of what form of data he will be provided and what limitations are inherent in the data systems. This is a very important area because the data provided to the Defense Systems Analyst identifies the nature of his contribution. Weak or erroneous data inputs can only result in weak or erroneous analyses unless this fact is recognized as a limitation by the analyst.

Analytical studies which are provided to the Marine Corps by both the Marine Corps and external organizations should be reviewed. Because the DSA may be validating or using the analytical efforts of other organizations, the DSA can benefit

from understanding who provides what analytical reports and what analytical organizations are available to assist him.

Finally, the prospective DSA should have the weapons system acquisition process presented to him. The proposed course would identify the actions involved in the Marine Corps' weapon system acquisition process and how these actions mesh with the PPBS cycle.

The author and officers of the MOS sponsors office are of the opinion that it would be beneficial to have a representative of the Sponsors office come from Washington and make a presentation of the POM development process from start to finish utilizing actual documentation. The visit could serve the purpose of making the presentation and of making a liaison visit. The lecturer could make his visit in the middle part of June thereby presenting his lecture to two successive classes. The January-input DSA class would take MN3950 in the last quarter and the July-input DSA class would take MN3950 in the fourth quarter. The curriculum allows this flexibility and the student has the prerequisite PPBS courses prior to the fourth quarter. There is a possibility that some of the new July-input class would be on board at that time so that the HQMC lecturer could make an orientation presentation at that time. Although the lecture visit is not considered to be absolutely crucial to the conduct of MN3950, it would provide the most timely input to a dynamic process.

IX. SUMMARY

The author examined the validity of the Naval Postgraduate School curriculum for training Defense Systems Analysts and in so doing generated a profile of the Defense Systems Analyst. The study was accomplished by the following steps:

1. Establishing the nature of the systems analysis discipline.
2. Describing the administrative procedures by which DSA billets are identified and authorized.
3. Illustrating where in the HQMC and DOD organizations the DSA billets are located and what functions are accomplished in each organization.
4. Describing the relationship of DSA functions to the PPBS and then illustrating the processes accomplished in DOD PPBS, DON PPS, and Marine Corps PPBS.
5. Generating a profile of the DSA.
6. Comparing the University of Rochester curriculum as a model to the Naval Postgraduate School curriculum and finding that although the Naval Postgraduate School curriculum is a strong curriculum it had a weakness in two analytical areas.
7. Recommending a curriculum change which preserved the strength of the previous Naval Postgraduate School curriculum while correcting the deficiencies noted.

8. Recommending a new course which is to teach prospective DSAs the PPBS processes conducted in the Marine Corps.

A. CONTINUING CURRICULUM REVIEW

The problem of reviewing the curriculum by which the DSA is educated must, in the opinion of the author, be conducted periodically due to changing requirements. Because of the probability of both systems analysis and the Marine Corps' requirements changing over time, the curriculum review must be accomplished on a continuing basis.

B. DSA/OPERATIONS ANALYST TRADE-OFF

The author found that many times MOS 9652 billets were filled by MOS 9650 (Operations Analysts). The SEP Monitor also indicated a willingness to fill MOS 9650 billets with MOS 9652 trained personnel. This situation suggests that there is a certain amount of interchangability between DSAs and Operations Analysts. It is an area in which additional study might suggest that one discipline sponsor could manage both MOS 9650 and MOS 9652 sponsorship. He could determine the proper mix of MOS 9650 billets and MOS 9652 billets. This is an area where fruitful study might be conducted.

APPENDIX A-1

B-16-dms/8
20 October 1970

MEMORANDUM FOR THE RECORD

Subj: Transfer of the Defense Systems Analysis Course from Rochester to USNPGS Monterey

1. This memorandum records information obtained while examining the feasibility of transferring the Defense Systems Analysis course from Rochester to USNPGS Monterey.
2. The present Rochester/CNA course costs the Navy $350,000/yr for up to 35 students. Assuming the quota is filled, this amounts to $10,000 per student for a 15 month course.
3. Monterey's tuition charge is $2500/student year. (Tab A) This is the cost billed to the Army and Air Force, based on "what the traffic will bear." The actual full cost per student year at Monterey is about $6000.
4. Whether the program is at Monterey or at Rochester, it is not actually costing the Marine Corps any green dollars (except for the student's pay and allowances). The Navy funds both programs and the Marine Corps gets a share of the DON quota. (The quota for Defense Systems Analysts has varied from 3 to 6).
5. On 19 October I discussed the feasibility of moving the DSA program from Rochester to Monterey with LCdr MASTERS and Cmdr COSTELLO of BUPERS (Rm 4066, ext. 42800/42403). They both agreed it is a high cost program and one they would like to be out of. However, they pointed out two problem areas concerned with moving to Monterey. The present program includes DOD civilians. No civilians are students at Monterey and Monterey's charter (Public Law) does not make any provision for civilian students. Secondly, they feel that the Rochester program is a "sacred cow" and protected by politics at the DON/OASD(SA) level. They view the Navy as merely the executive agent for a DOD program.

6. The $350,000 is a separate line item in the Navy budget and previous attempts during reduction drills to reduce or eliminate this line item have been rebuffed. Thus the feeling at BUPERS is that this line item is not really competitive with other Navy programs (i.e., put it in, and it will be approved every time).
7. In view of the above information and in view of the limited actual impact on the Marine Corps, no further action is contemplated at this time.

John M. Hey

APPENDIX A-2

ATB-12-spl
2 Nov 1972

MEMORANDUM FOR BRIGADIER GENERAL BOHN

Subj: Defense Systems Analysis (DSA) Billet Requirements

Encl: (1) DSA Billet Information
(2) DSA Personnel Recap
(3) T/O Estracts; Programs & OSD(SA)

1. Code ATB is designated as the discipline sponsor for the Defense Systems Analysis program, MOS 9652. This MOS is assigned as an additional MOS to officers who have successfully completed a prescribed course of instruction at an accredited college or university. The DOD sponsor is the Navy and the program is currently conducted through the University of Rochester.

2. The MOS manual provides the following MOS description summary for MOS 9652 (DefSysAnal):

"Directs, supervises, conducts, or participates in studies and analysis of force structures, weapon systems mixes, and cost-effectiveness comparisons at top level management and command levels."

3. The Marine Corps is currently suffering an accute shortage of officers with Defense Systems Analysis background and this situation holds no promise of early resolution. The problem is simply this:

(a) There are 17 DSA trained officers in the Marine Corps.

(b) There are 16 billets in the Marine Corps which state a requirement for MOS 9652 (enclosure (1)).

(c) There are no additional officers being trained in the pipeline at this time.

(d) Utilizing the accepted 2.4 offices/billet staffing factor the Marine Corps goal in this discipline is 38 officers, i.e., a current shortfall of 21 with no remedial action underway (enclosure (2)).

4. The root of the problem is the Marine Corps inability to enlist applicants in the program compounded by a low acceptance rate of our applicants by the University of Rochester.

Subj: Defense Systems Analysis (DSA) Billet Requirements

The problem can be attacked on this front but the results will not bear fruit, i.e., qualified personnel, for almost two years. Another, more immediate approach which might assist the SEP monitor as he attempts to staff this billet is a critical review of the DSA billets by the billet sponsor in order to determine whether the 16 billets demand the study discipline or if the requirements might be reduced/modified to allow staffing with other disciplines, eg., Operations Analysts, MOS 9650. The MOS manual provides the following summary for MOS 9650 (Opns Anal):

"Directs, supervises, conducts or participates in the analysis of military operations or weapons systems, cost effectiveness studies, program management, and war gaming or other simulations activities at research and development activities, programming and management activities or operational units of the Fleet Marine Force."

5. Based on my knowledge of the curricula at NPGS Monterey and the University of Rochester, and a review of the DSA billets, I am of the opinion that several of the present billets could be modified to require OA or SA backgrounds.

6. Accordingly, I recommend the attached memo to the billet sponsors as a means of reducing the present shortfall. I have discussed this matter in detail with the SEP monitor.

Very respectfully,

W. M. Krulak

APPENDIX B

MANAGERIAL ECONOMICS/ADMINISTRATIVE SCIENCE CURRICULUM

The Marine Corps has established billets requiring graduate education that are entitled Defense Systems Analyst (MOS 9652). While the Rochester course was available, the graduate education for Marine Defense Systems Analysts was conducted at Rochester. With the closing of the Rochester program, the Marine Corps Education Branch looked for a replacement, and after contact and discussions with the Marine Corps Representative and certain faculty members of the Naval Postgraduate School, it was determined that the educational requirements for Defense Systems Analysts could be met with a tailored management curriculum at NPS.

In the course of the aforementioned discussions, Dr. Carl Jones and Dr. Mike Sovereign held informal talks with Major Dan Hitzelberger in the Requirements and Programs Division at Headquarters Marine Corps. The Requirements and Programs Division is the primary sponsor for Defense Systems Analysts (MOS 9652) who are involved in analyses of the use of economic resources and investgiation of alternatives for Marine Corps projects and programs. As a result of the contacts and talks, Dr. Jones, Dr. Sovereign, LCOL R. E. Jamison and LCDR Peter Browne prepared a feasible curriculum guide for the education of the Marines undergoing study for later assignment as Defense Systems Analysts. As a matter of note, all FY 75 Marine selections for the Management curriculum at NPS are identified

for MOS 9652 type assignments. The curriculum guide attached as enclosure (1) was prepared to allow certain flexibility in providing the required education by allowing for individual interests to be pursued within general guidelines and to provide for alternative courses when the NPS scheduled courses cannot be fitted to individual Marine student schedules.

for MOS 9652 type assignments. The curriculum guide attached as enclosure (1) was prepared to allow certain flexibility in providing the required education by allowing for individual interests to be pursued within general guidelines and to provide for alternative courses when the NPS scheduled courses cannot be fitted to individual Marine student schedules.

Curriculum

The first two quarters of the management curriculum are to remain intact, allowing, of course, for individual validation where appropriate.

First Quarter

MA 2040	Matrix Algebra
MA 2305	Differential Calculus
MN 2031	Economic Decision Making
MN 2106	Individual and Group Behavior
MN 2150	Financial Accounting
MN 0001	Seminar

Second Quarter

MA 2306	Integral Calculus
PS 3005	Probability
MN 3105	Organization and Management
MN 3140	Microeconomic Theory
MN 3161	Managerial Accounting
MN 0001	Seminar

Graduate Program

In the graduate program courses identified A and B represent choices within the alternatives as indicated:

	Elective A
SM 4304	Seminar in Acquisition Management
or	
MN 4161	Controllership
or	
MN 4152	Decision Making for Financial Management
or	
MN 4151	Internal Control and Auditing

Curriculum

The first two quarters of the management curriculum are to remain intact, allowing, of course, for individual validation where appropriate.

First Quarter

MA 2040	Matrix Algebra
MA 2305	Differential Calculus
MN 2031	Economic Decision Making
MN 2106	Individual and Group Behavior
MN 2150	Financial Accounting
MN 0001	Seminar

Second Quarter

MA 2306	Integral Calculus
PS 3005	Probability
MN 3105	Organization and Management
MN 3140	Microeconomic Theory
MN 3161	Managerial Accounting
MN 0001	Seminar

Graduate Program

In the graduate program courses identified A and B represent choices within the alternatives as indicated:

	Elective A
SM 4304	Seminar in Acquisition Management
or	
MN 4161	Controllership
or	
MN 4152	Decision Making for Financial Management
or	
MN 4151	Internal Control and Auditing

	Elective B
MN 3760	Manpower Economics
or	
MN 4191	Decision Analysis
or	
OA 4613	Theory of Systems Analysis

First Quarter

MN 4154	Seminar in Financial Management (Gov't Accounting)
SM 3304	Methods and Practices of Procurement and Contract Administration
MN 3211	Operations Analysis for Management I
MN 3172	Public Policy Processes
CS 0113	COBOL Programming
MN 0001	Seminar

Second Quarter

MN 3212	Operations Analysis for Mangement II
MN 4145	Systems Analysis
*MN xxxx	New Course
MN/SMxxx	Elective A
MN 0001	Seminar

*A course to be developed covering budgeting, POM, R&D cycle, etc., as conducted by USMC.

Third Quarter

MN 3183	Management Information Systems and the Computer
MN/OAxxxx	Elective B
MN 0810	Thesis Research
MN 0810	Thesis Research
MN 0001	Seminar

Fourth Quarter

MN 4105	Management Policy
OA 4614	Methods and Practice of Systems Analysis
**MN 4181	Applications of Management Information Systems
MN 0810	Thesis Research
MN 0001	Seminar

**Either MN 3214.

NOTE: There will be three course allowances for thesis research and the assignment may be either two in the third quarter and one in the fourth quarter or one in the third quarter and two in the fourth.

Enclosure (1)

APPENDIX C

TABLE OF MANPOWER REQUIREMENTS
MOS 9652 Billets

Line No.	Description	Grade	No.
T/O 5001	MARCOR Asgn - DOD		
121	OPNS RES/Sys Analyst	LtCol	1
T/O 5004	Defense Communications Agency		
70	MGR (Defense Sys Anal)	LtCol	1
72	MGR (Defense Sys Anal)	LtCol	1
T/O 5101	Manpower Department HQMC		
108	MPR Prog Off	LtCol	1
109	OP Budget Off	Maj	1
T/O 5104	Requirements and Programs Division		
20	GRND Prog Off	LtCol	1
26	Def Sys Anal	Maj	1
27	Def Sys Anal	Maj	1
29	Cost Anal	LtCol	1
41	Structure Req Off	Maj	1
T/O 5105	Plans and Operations Department HQMC		
33	Plans Off/Midrange/	LtCol	1
T/O 5107	Aviation Division HQMC		
64	Sys Anal	LtCol	1
T/O 5111	Fiscal Division HQMC		
110A	HEAD	LtCol	1
110E	Sys Anal	Maj	1
T/O 5113	Info Sys Spt/Mgmt Div		
48	Sys Anal/Review Off	Maj	1
T/O 7441	HQ DEVCEN MCDEC Quantico		
216	Org/Opns Analysis Off	Maj	1
	TOTAL MOS 9652 Billets		16

APPENDIX D

BILLET EDUCATION EVALUATION CERTIFICATES
FOR MOS 9652 BILLETS

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5101	108	Manpower Programs Officer Programs and Budget Section Manpower Plans, Programs and Budget Branch

Grade

LtCol

Curriculm should include (list comprehensive area and/or electives required for this billet)

Economics
Econometrics
Systems Analysis/Operations Analysis
Computer & Numerical Analysis
Theory of Decision-Making
Criteria for Public Expenditures
National Security Objectives
Defense Department Management
Statistics
Mathematical Operations Research
Strategic Studies and Analysis of Defense Policy Decisions

Justification (Simple Brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

The incumbent of this billet has the requirement to respond to DoD papers prepared primarily by Systems Analysts, and must have a working knowledge of the quantitative techniques of modern management. He must originate documents to DoD for adjustments to Marine Corps programs. These documents must justify proposed changes with detailed rationale suitable for analysis by DoD analysts. He analyzes Marine Corps programs with the purpose of improving computer requirements methodology. The incumbent also supervises one military billet for which Special Education has been previously approved as necessary.

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5104	20	Ground Programs Officer, Programs Branch, DC/S for R&P

Grade

LtCol

Curriculum should include (list comprehensive area and/or electives required for this billet)

(1) Economics
(2) Econometrics
(3) Probability & Statistics
(4) System Analysis/Operations Analysts
(5) Computer & Numerical Analysis
(6) Theory of Decision-Making
(7) National Security Objectives
(8) Criteria for Public Expenditures
(9) Defense Department Management

Justification (Simple Brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

The billet incumbent needs a specialized education in economics, data processing, systems analysis, resource allocation techniques, and linear programming. This education is used to identify preferred alternatives when programming future force structures or evaluating trade-off decisions necessitated by the Planning, Programming and Budgeting System (PPBS). This special education is required to permit the incumbent to provide the technical systems analysis support to perform within the PPBS and to permit the knowledgeable exchange of information with the Department of the Navy PPBS activities.

APPENDIX D (continued)

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5104	26	Defense Systems Analyst, Systems Analysis Branch, DC/S R&P

Grade

Major

Curriculum should include (list comprehensive area and/or electives required for this billet)

(1) Economics
(2) Econometrics
(3) Probability & Statistics
(4) Systems Analysis/Operations Analysis
(5) Computer & Numerical Analysis
(6) Decision Making Theory
(7) Criteria for Public Expenditures
(8) National Security Objectives
(9) Defense Department Management

Justification (Simple Brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

The billet incumbent needs a specialized education in economics and mathematics, and in systems analysis techniques. The education permits the incumbent to evaluate alternatives when judging weapons systems or force structures, or when examining other problems that consider both cost and quantifiable effectiveness.

The assigned officer requires this education to provide systems analysis support to the continuous appraisal of Marine Corps programming performed by the Office of the DC/S for R&P, and, on an as-available basis, to perform analyses in support of the entire HQMC staff, or to provide procedural and technical assistance to the staff. This systems analysis expertise also enables the incumbent to conduct the required liaison with the systems analysis activities of the other services, the JCS and the OSD in a professional manner.

APPENDIX D (continued)

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5104	27	Defense Systems Analyst Systems Analysis Branch, DC/S for R&P

Grade

Major

Curriculum should include (list comprehensive area and/or electives required for this billet)

(1) Economics
(2) Econometrics
(3) Probability & Statistics
(4) Systems Analysis/Operations Analysis
(5) Computer & Numerical Analysis
(6) Decision Making Theory
(7) Criteria for Public Expenditures
(8) National Security Objectives
(9) Defense Department Management

Justification (Simple Brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

The billet incumbent needs a specialized education in economics and mathematics, and in systems analysis techniques. The education permits the incumbent to evaluate alternatives when judging weapons systems or force structures, or when examing other problems that consider both cost and quantifiable effectiveness.

The assigned officer requires this education to provide systems analysis support to the continuous appraisal of Marine Corps programming performed by the Office of the DC/S for R&P, and, on an as-available basis, to perform analyses in support of the entire HQMC staff, or to provide procedural and technical assistance to the staff. This systems analysis expertise also enables the incumbent to conduct the required liaison with the systems analysis activities of the other services, the JCS and the OSD in a professional manner.

APPENDIX D (Continued)

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5104	29	Cost Analyst, Systems Analysis Branch, DC/S for R&P

Grade

LtCol

Curriculum should include (list comprehensive area and/or electives required for this billet)

(1) Economics
(2) Economics Analysis
(3) Probability and Statistics
(4) Mathematical Operations
(5) Systems/Operations Analysis
(6) Computer and Numerical Analysis
(7) Theory of Decision Making
(8) Criteria for Public Expenditures
(9) National Security Objective
(10) Defense Department Management
(11) Governmental Budgeting
(12) Accounting

Justification (Simple Brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

Requires graduate level knowledge in the defense systems analysis field sufficient to provide effective staff planning, coordination, command advisory functions and procedural and technical assistance to the HQMC staff; requires expertise in the conduct of required liaison with the cost/systems analysis activities of the other services the JCS and the OSD; requires an analytical ability and professional knowledge in cost/systems techniques, concepts and procedures involved in systems analysis and Marine Corps Force Structure Cost Model (MCFS CM). As Assistant Head of the Cost A&R Section will coordinate the maintenance, updating and operation of the MCFS CM; evaluate and act on user requests for MCFS CM support; and provide interpretation of the model's output.

APPENDIX D (Continued)

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5105	33	Mid-Range Plans Officer Service Plans Branch, Plans Division DC/S for P&O

Grade

LtCol

Curriculum should include (list comprehensive area and/or electives required for this billet)

(1) Micro-economics
(2) Statistics
(3) Econometrics
(4) Mathematical Analysis
(5) Theory of Decision - Making Under Uncertainty
(6) Public Finance
(7) Research and Analysis of Management Techniques Utilized by Non-Profit Organizations
(8) National Economic Planning and Accounting
(9) Theory of Political Decision-Making

Justification (Simple, brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

The occupant of this billet requires a specialized education in disciplines that provide the capability to employ defense systems analysis to produce alternatives for efficient and productive allocation of resources. The accomplishment of this function provides for the determination of Marine Corps force requirements and objectives and coordination/development/ evaluation of supporting/implementing plans. This effort is reflected in the Service Plans Branch responsibility for the Marine Corps Capabilities Plan, Mid-Range Plan and Long-Range Plan. Additionally, Marine Corps interaction with various Navy, JCS and other DOD agencies/activities requires careful consideration of resource allocations and the impact on Marine Corps requirements and objectives. This officers background should be such that he can provide analytic support to the Director Plans Division as required. Finally, the billet occupant must be of a rank and experience that provides for a meaningful and effective level of liaison with analysts and planners both within and outside HQMC.

APPENDIX D (Continued)

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5107	64	Systems Analyst, Studies and Analysis Section, Plans and Readiness Branch, Deputy Chief of Staff for Aviation, HQMC

Grade

LtCol

Curriculum should include (List comprehensive area and/or electives required for this billet)

Graduate level work in the following areas:
(1) Economics
(2) Economic Analysis
(3) Probability and Statistics
(4) Operational Research
(5) Systems Analysis
(6) Strategic Studies and Analysis

Justification (Simple, brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

This billet is required to provide DC/S for Aviation with analytical support in the determination of Marine Corps Aviation requirements and in the presentation and justification of these requirements to the Office of the Secretary of Defense. Functions of the billet are as follows:

1. Monitor ongoing studies which have implications pertaining to Marine Aviation Programs and keep the Deputy Chief of Staff for Aviation informed of the current status of these studies.
2. Recommend initiation of studies and coordinate the study effort to assist in determining requirements.
3. Establish and maintain contacts with Systems Analysis and Studies agencies within OSD, OJCA, DON, DOAF, and HQMC in matters relating to the determination of requirements and development of the total Marine Aviation Program.
4. Assist the Plans, Programs and Readiness Branch in the presentation and justification of requirements.

APPENDIX D (Continued)

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5111	102	Head, Management Analysis & Review Section Analysis & Review Branch Fiscal Divsion, HQMC

Grade

LtCol

Curriculum should include (list comprehensive area and/or electives required for this billet)

Economics
Economic Analysis
Probability and Statistics
Mathmatical Operations
Systems/Operations Analysis
Computer and Numerical Analysis
Theory of Decision Making
Econometrics
Criteria for Public Expenditures
National Security Objective
Defense Department Management
Governmental Budgeting
Management Accounting
Operations Management

Justification (Simple, brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

Requires graduate level knowledge in the defense systems analysis field sufficient to provide effective staff planning, coordination, command advisory functions and procedural and technical assistance to the HQMC staff; requires expertise in the conduct of required liaison with the cost/systems analysis activities of the other services, the MCS and the OSD; requires an analytical ability and professional knowledge in cost/systems techniques, concepts and procedures involved in systems analysis. As Head of the Management A&R Section will coordinate the analysis of studies, validation of weapons systems cost effectiveness comparisons and weapon system mix studies and validation of management improvement procedures to include examination, analysis and appraisal of operating programs and determination of their efficiency and effectiveness and appraisal of alternatives that may be more cost effective.

APPENDIX D (Continued)

T/O Number	Line Number	Billet Title/Organization Title/ Organization Location
5113	48 223A	Systems Analyst/Review Officer, Management Engineering Branch, Information Systems Support and Management Division, HQMC

Grade

Major

Curriculum should include (list comprehensive area and/or electives required for this billet)

OA 3611	Systems Analysis I	Operations Analysis
OA 3612	Systems Analysis II	Accounting
OA 3605	Methods of Operations Research/Systems Analysis	Cost/Benefit Analysis
		Econometrics
OS 3204	Defense Resource Analysis	Decision Theory
OA 4632	Mathematical Programming	Economic Theory
MN 3130	Macroeconomics Theory	
MN 4043	Economic Development	
MN 4145	Systems Analysis	
PS 3012	Probability and Statistics for Management I & II	

Justification (Simple, brief narrative explaining why the occupant of this billet requires the special education described. What does he do with the knowledge? How does he employ it?)

The officer filling this billet will be required to direct, supervise, conduct or participate in analysis of Automated Data Systems. He will use empirical data, economic theory, and mathematical techniques to establish the comparative factors and alternatives available to functional managers/ systems sponsors. The incumbent will be required to provide technical support to systems sponsors to define problems, identify alternatives, and implement cost effectiveness criteria. He will be required to be knowledgeable in the area of cost/economic analysis as related to Automated Systems. He should possess a working knowledge of computer configurations and their associated capabilities and limitations.

APPENDIX E

POOL OF MOS 9652 TRAINED OFFICERS

Name	Grade	Grad. Date	Academic Program
Trained:			
Grace, J. J.	06	67	University of Rochester
Hutchinson, W. E.	06	67	University of Rochester
Lutz, T. J., Jr.	06	70	University of Rochester
Needham, R. C.	06	69	University of Rochester
Dye, J. M.	05	72	University of Rochester
Eller, F. P., Jr.	05	70	University of Rochester
Evans, E. E., Jr.	05	71	University of Rochester
Franklin, C. R.	05	70	University of Rochester
McKinstey, W. E.	05	71	University of Rochester
Milligan, R. F.	05	69	University of Rochester
Yadlowsky, P.	05	69	University of Rochester
Hoekstra, J. V.	04	75	Naval Postgraduate School
Krulak, W. M.	04	72	University of Rochester
Quinlan, D. A.	04	70	University of Rochester
Town, K. R.	04	69	University of Rochester
In-Training:			
Eirich, D. G.	04		Naval Postgraduate School
Honbarrier, H. L.	04		Naval Postgraduate School
Sullivan, R. J.	04		Naval Postgraduate School
Walker, J. S.	04		Naval Postgraduate School
Millard, C. A.	03		Naval Postgraduate School

APPENDIX F

COURSE DESCRIPTIONS FOR NAVAL POSTGRADUATE SCHOOL COURSES

MN0001 SEMINAR FOR MANAGEMENT STUDENTS(0-2). Guest Lecturers. Thesis and research presentations.

CS0113 COBOL PROGRAMMING(3-0). The basic elements of COBOL are covered. Practical application of principles is afforded by means of a series of problems of increasing difficulty. Television lectures.

MN2031 ECONOMIC DECISION MAKING(4-0). The macroeconomic section includes a presentation of methods of national income determination, the consumption function and multiplier concepts and the impat of fiscal and monetary policies. The microeconomic section covers an introduction to individual economic decision processes and their relation to attainment of market equilibria.

MA2040 MATRIX ALGEBRA(2-0). Linear equations, systems of linear equations, determinants, matrices and vectors addition and multiplication of matrices, inverse of a matrix, partitioned matrices, vector spaces and subspaces, rank of a matrix. This course is designed primarily for students in management.

MN2106 INDIVIDUAL AND GROUP BEHAVIOR(4-0). A survey of individual and group behavior with emphasis on those aspects which affect performance and satisfaction within an organization. Topics include motivation, learning, personality, leadership, group effectiveness and role behavior.

MN2150 FINANCIAL ACCOUNTING(4-0). Study of the basic postulates and principles of accounting. Specific topics include the accounting cyle, asset valuation, equities and capital structure, financial statement analysis, and elementary cost accounting.

MA2305 DIFFERENTIAL CALCULUS(3-0). Brief review of algebra, differential calculus of power functions, logarithmic functions and exponental functions; multivariable calculus; maxima and minima with and without constraints. Applications will be primarily from field of economics and management. This is the first of a two-course sequence in calculus designed primarily for students in management.

MA2306 INTEGRAL CALCULUS(2-0). Integral calculus of power functions, logarithmic functions and exponential functions. This course is designed primarily for students in management.

PS3005 PROBABILITY(3-0). A one-quarter course in probability. Random variables, probability mass functions, density functions, sample spaces, probability axioms, independence, moments, derived distributions. Bayes Theorem, sampling, sample statistics. This course is designed primarily for students in management.

MN3105 ORGANIZATION AND MANAGEMENT(4-0). The study of the management of organizations emphasizing human and organizational variables and their implications for managerial action. Topics include the theories of management, organizational behavior, planning and control, and organizational development.

MN3124 ANALYSIS OF BUREAUCRACY(4-0). An analysis of the forms and processes of complex organizations in evolution from charisma to bureaucracy. Topics include formal dimensions of structure, informal structure, professionalism, basic growth and elaboration processes, and applications of general systems theory to organizational phenomena.

MN3140 MICROECONOMIC THEORY(4-0). Determination of the allocation of resources and the composition of output. Consumer and Producer Choice Theory. Partial and general equilibrium analysis. Welfare economics. Applications to defense problems are emphasized.

MN3143 MANAGERIAL ECONOMICS(4-0). Microeconomic theory and its applications and capital budgeting; significance of market structure upon performance, investment decisions and capital budeting. Case and Industry studies.

MN3161 MANAGERIAL ACCOUNTING(4-0). Survey of cost accounting systems, including overhead costing, job order and process cost systems, variable and absorption costing, and standard costs. Emphasis is on applications of accounting data to planning, control and decision making. Topics covered include flexible budgets, variance analysis, cost-volume-profit analysis, and incremental profit analysis. Capital budgeting is examined extensively.

MN3172 PUBLIC POLICY PROCESSES (4-0). A presentation of the processes by which resources are allocated to the production of goods in the Defense sector. Defense budget preparation. Presidential policy-making and management, and Congressional budget action are considered and placed within the context of the theory of public goods.

MN3183 MANAGEMENT INFORMATION SYSTEMS AND THE COMPUTER(4-0). Study of what an information system is, how the computer and other resources fit into the system, and management considerations involved in computer-based and other information systems. Study of basic computer and MIS concepts

as required, including computer and data structures, input/output systems, and file organization. Survey of programming and data-base management languages at various levels. This course is for 817 Management students.

MN 3211 OPERATIONS ANALYSIS FOR MANAGEMENT I(4-0). A survey of the philosophy and methods of operations research. Emphasis is on model building and the application of the models to managerial problems.

MN3212 OPERATIONS ANALYSIS FOR MANAGEMENT II(4-0). A continuation of MN 3211.

MN3371 PROCUREMENT AND CONTRACT ADMINISTRATION(4-0). Study of the elements of the procurement process. Coverage includes the determination of requirements, techniques used in purchasing, the military-industrial complex and its role in providing material and service, the management of on-going programs, and the environment in which the acquisition takes place. Military procurement regulations are analyzed to determine their impact on efficient military logistics systems.

MN3645 INVESTIGATIVE METHODS OF ECONOMICS I(4-0). Development and applications of econometric models of particular interest to public sector managers. Topics include demand forecasting, production function estimates and cost estimating.

MN3760 MANPOWER ECONOMICS(4-0). This course contains both theoretical and empirical issues in manpower economics. The theoretical development emphasizes individual employment, job searching, mobility and career decisions. Empirical work presented will include studies on the all-volunteer force, hazardous duty compensation and re-enlistment bonuses.

MN4105 MANAGEMENT POLICY(4-0). Study and appraisal of a variety of policies requiring the analysis of problems and the formulation of decisions in both business and governmental enterprises. Use of case material, management games, and other devices as exercises in decision making and the executive action under conditions of uncertainty and change.

MN4145 SYSTEMS ANALYSIS(4-0). This course will concentrate on the analysis of large scale defense resource allocation problems, using cost-effectiveness models. Topics include: discounting, constrained optimization, estimation problems, and efficiency over time. Systems analysis case studies will be emphasized.

MN4151 INTERNAL CONTROL AND AUDITING(4-0). Study of the objectives and procedures of internal control in government and industry. Examination of the independent audit function, including auditing standards and reports. Consideration of the principal Federal audit organizations. Specialized topics including sampling techniques for auditing, audits of computer-based systems, and audit problems associated with selected assets and operations.

MN4152 DECISION MAKING FOR FINANCIAL MANAGEMENT(4-0). The management of the finance function in government and industry. Specific topics include cash and working capital management, long-term financing, determination of optimal capital structure, and valuation of a going concern.

MN4154 SEMINAR IN FINANCIAL MANAGEMENT(4-0). Study of the theories of and applications in the administration and allocation of financial resources.

MN4162 COST ACCOUNTING(4-0). Review of various definitions of cost and alternative ways of measuring cost. Study of cost accounting systems, methods of allocating costs to cost objects, and the costing of activities, products, and projects. Consideration of the objectives and the substance of Federal cost accounting standards.

MN4191 DECISION ANALYSIS(4-0). A continuation of MN3212 with particular emphasis on the decision analysis framework for managerial action within DOD.

SM4305 LOGISTIC SUPPORT(4-0). This course defines and describes the major fields of logistic support and introduces various models of logistical areas. These areas of support include: personnel, consumables, facilities, material transportation and maintenance. The field of integrated logistics support is introduced along with trade-offs between types of support in optimizing support systems. Data bases and techniques for determination of support requirements are treated briefly.

OA4613 THEORY OF SYSTEMS ANALYSIS(4-0). Systems analysis (cost-effectiveness analysis) formulated as commensurable and incommensurable physical capital investment choice models. Emphasis on decision rules and the nature of opportunity costs with respect to scale and timing of investment. Interpretation of methods of risk modeling and solution computation. Theory of the second best; theory of the social discount rate. Introduction to models of planning and control emphasizing decentralization of the decision-making problem.

OA4614 METHODS AND PRACTICE OF SYSTEMS ANALYSIS(4-0). Advanced study in the methods and practice of systems analysis with emphasis on cost analysis; cost models and methods for total program structures and single projects; relationship of effectiveness models and measures to cost analyses; public capital budgeting of interrelated projects; detailed examples from current federal practices.

MN4645 INVESTIGATIVE METHODS OF ECONOMICS II(4-0). Specification of economic systems. Simultaneous equations and identification issues in econometric model construction. Application of econometric methods in analyses of industrial organization and economic planning.

MN4920 PUBLIC EXPENDITURE ANALYSIS(4-0). A presentation of basic concepts such as public goods, joint production and externalities which necessitate governmental market intervention. Techniques to analyze the effects and desirability of particular government expenditures are covered and include the theory of second best, cost-benefit analysis, consumer surplus, and social discounting.

MN4941 MICROECONOMIC THEORY AND POLICY(4-0). Advanced study of equilibrium and disequilibrium microeconomic systems. Topics include consumer choice, producer choice, market structure, risk, imperfect competition and regulation, and economic planning models. Policy issues and their implication for national action.

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